WASH-1523

ENVIRONMENTAL STATEMENT

LEASING OF AEC CONTROLLED URANIUM BEARING LANDS

Colorado, Utah, New Mexico

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SEPTEMBER 1972

UNITED STATES ATOMIC ENERGY COMMISSION

RESPONSIBLE OFFICIAL:

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I. SUMMARY

The Atomic Energy Commission proposes to lease certain AEC controlled lands in the Colorado Plateau region for the production of uranium-vanadium ores which have been developed at Federal Government expense. There are about 25,000 acres of land available for leasing in about two dozen tracts, most of them scattered along the Uravan Mineral Belt in western Colorado and eastern Utah. One is in northwestern New Mexico. The lands are located in long established mining districts, and most were mined previously under AEC leases until 1962. The known reserves of uranium-vanadium ores on these lands are substantial and the potential for further ore discovery is also good. The known reserves alone when produced and delivered to a mill have a market value on the order of $45 to 50 million.

Productivity of the Uravan Mineral Belt as a whole has been declining over a period of years as old mines are exhausted and new ore deposits become harder to find. As a result, six ore processing mills which previously served this area have closed down; only one mill remains in operation .

If the remaining mill at Uravan, Colorado, were to close, most mines in the area would close also due to added shipping cost and lack of facilities to treat this type of ore elsewhere. Even if operations were to restart at a later date, there would be a substantial loss of economic reserves in presently operating properties, due to the added costs

associated with reopening and rehabilitation to complete mining of existing ore bodies. The leasing of the AEC lands will encourage maximum recovery of the remaining valuable resources of uranium and vanadium in this area.

Ore from the AEC lands, supplementing production from other mines in the area, would be expected to extend the production of uranium in the Uravan Mineral Belt for at least 5 years and more likely 10 to 20 years. Continued mining in the district would maintain direct employment at about the current level of 1300 persons, and indirectly support a much larger group. Mining is by far the largest source of income in this area, and uranium-vanadium ores are the most important mineral product.

An appraisal of the AEC controlled lands was made to determine the potential adverse environmental effects of the proposed leasing program. For this purpose a multi-disciplined team was used which included experts in various fields from: the Bureau of Land Management of the Department of Interior; Lucius Pitkin, Inc., a contractor for AEC; the Forest Service, Department of Agriculture for certain lands; and the AEC. Factors considered include:

1. Present multiple use practices including range and livestock, wildlife, and recreation.
2. Prehistoric and historic values.
3. Soil and watershed, forestry, roads, other mineral values.

4. Mining requirements for water and other resources.
5. Water, air, and other pollution possibilities from mining and milling operations.
6. Proposed land use projects.
7. Potential effects on local communities, water, power supplies, schools and other facilities.

As a result of this review, draft stipulations were developed, and will be included in lease agreements to minimize potential adverse effects of the conduct of exploration and mining activities on the AEC controlled lands. With the use of these stipulations it is felt that the lands can be leased for mining with a minimum level of adverse environmental effect. Some surface disturbance in mining is unavoidable, and in this semi-arid area vegetation is slow to become reestablished. Nevertheless, with grading and contouring of mine waste rock piles to the extent feasible, covering with topsoil where available, and seeding, the impact will be minimized. For open-pit mines, the overburden piles will be required to be contoured, and the open-pits backfilled to the extent feasible to reduce visual impact. The AEC also plans to use the leasing program to clean up some undesirable conditions resulting from past mining operations on these lands.

The alternatives to this plan are relatively few:

1. Do not lease, and return lands to the public domain.
2. Do not lease, and maintain lands in withdrawn status.

In view of the existence of valuable reserves, Alternative 1 would probably result in a land rush of considerable proportions. The properties would be mined, and the Government would not have lease agreements to enable it to exert control over environmental impact of mining activities. Therefore, environmental impact could be expected to be greater than under Government leases.

Alternative 2 would defer for an indefinite period further metal mining activity on the lands. However, as undesirable side effects it would risk reduction in the quantity of valuable resources of uranium and vanadium that could be economically recovered if mining is too long delayed, and would also result in economic hardship in the area involved. Alternative 2 would also result in consumers of uranium and vanadium obtaining these commodities from some other source. The AEC-controlled lands contain higher grade ore than the average of U. S. reserves, they are in an area of extensive mining over many years, and most of them have been mined before. Therefore, it is reasonable to expect that the overall environmental impact of mining on the AEC lands would be no greater and could well be less than if the same quantity of uranium and vanadium were mined elsewhere.

The use of fossil fuels is not proposed as an alternative to the leasing program, as it is not considered a realistic alternative, since the amount of uranium involved is only a small proportion of the

U. S. reserves. If the resources in the AEC-controlled lands and nearby areas were not available, uranium production would be increased from other sources. The effect of the leasing program on overall availability of uranium from the viewpoint of the utility industry would be relatively small, and could not reasonably be expected to influence the decision of any utility concerning methods or choice among available fuels (coal, oil, gas, or nuclear) for generating electric power.

The anticipated benefits of the leasing of AEC-controlled mineral-bearing lands include the conservation of resources, the utilization of mineral products important to the economy, financial benefits to Federal, State and local Governments, and support to the economy of the local communities.

The alternatives to the proposed leasing program do not hold promise of less overall adverse environmental effect. Alternative 1, returning the lands to the public domain, would make them available for mining without environmental stipulations. Alternative 2, holding the land in withdrawn status, would remove the opportunity to clean up, through lease stipulations, some undesirable conditions from past mining activities. The uranium would be produced from some other source, probably not subject to the environmental controls to be used in the leasing program.

Considering the substantial anticipated benefits versus the rather minimal adverse environmental effects and dollar costs, and in view of the range of reasonable alternatives and their environmental impact, it has been determined that the proposed leasing program should be undertaken.

II. BACKGROUND

A. DETAILED DESCRIPTION

1. Proposed Action

The Atomic Energy Commission proposes to lease Commission controlled mineral bearing lands in the Colorado Plateau region for the production of uranium and vanadium bearing ores which have been developed at Government expense. There are about 25,000 acres of land in about two dozen tracts, most of which are scattered along the Uravan Mineral Belt in western Colorado and eastern Utah. One is in northwestern New Mexico. The lands are located in long established mining districts, and most were mined previously under AEC leases until 1962. These lands are estimated to contain developed reserves of more than 6,000,000 pounds of uranium oxide and about 40,000,000 pounds of vanadium oxide, which, when mined and delivered to a mill, would have a gross value on the order of $45 to 50 million. Although extensive exploration work has been done, there are still favorable areas which have not been fully explored. Consequently, in addition to the developed ore reserves on these lands, the potential for finding new reserves is regarded as very good. After leasing begins, possibly in first half of 1973, three to five years work will probably be required to reach full production. Ore production from the AEC lands is likely to continue for 10 to 20 years.

2. Past Operations

The Uravan Mineral Belt is a 200 mile long, generally north-south trending mineralized area in southwest Colorado and eastern Utah. It is an old mining district in which "carnotite ores" have been mined from time to time since the turn of the century. Carnotite is a yellow colored mineral containing vanadium, uranium, and the radium associated with it. Each of these elements has been the principal product at different times. Demand for vanadium and radium was severely affected in early 1920's by discovery of higher grade sources elsewhere. After depletion of the rich Peruvian source of vanadium in about 1934, a limited market for U.S. carnotite ores again developed. In early 1942, the U.S. Government declared vanadium a strategic metal and set up a buying program under the Metals Reserve Corp. This program terminated February 28, 1944.

In 1943, the Manhattan Engineer District, predecessor to the Atomic Energy Commission, initiated a program to recover uranium from vanadium tailings, and to undertake uranium exploration and production in connection with the national defense effort.

The Atomic Energy Commission came into being on the first day of 1947. In that year it signed contracts with two private

companies to process uranium-bearing ore at their mills located at Naturita and Rifle, Colorado, and produce high grade concentrates for sale to AEC. The total known reserves of uranium ores in the U.S. were about one million tons of ore averaging 0.2% U_3O_8, and were completely inadequate to meet the urgent national defense requirements. In order to find more uranium, AEC initiated an ore purchase program and bonus offer for discovery and production of high grade ores to get interest and participation of private industry. AEC also contracted directly for exploration drilling to hasten ore discovery, withdrawing certain areas from mineral entry while they were being evaluated. When ore bodies were found they were leased to private companies for mining. As the private exploration effort expanded the AEC withdrew from direct exploration activities. Most of the withdrawn ground which had not been explored, or on which AEC preliminary efforts had not resulted in significant ore finds, were returned to the public domain so that they could be made available for private industry exploration.

The lands AEC now has available for leasing represent the remainder of more than 700 square miles of land that had been withdrawn in 1948-54, the balance having since been restored to the public domain. Included in the land still held are some patented claims acquired from the Manhattan Engineer District.

The Uravan Mineral Belt production in the past has been characterized by a large number of small mines, some of which produced steadily over a period of years, and others which operated sporadically. During the 1950's, about 750 mines operated for varying periods of time on privately controlled land in the Uravan Mineral Belt, and approximately 3,250,000 tons of ore valued at about $108,500,000 were produced.[1/] In the same period, 65 mines on 50 AEC leases produced 1,070,000 tons of ore valued at about $38,400,000. Average grade was 0.30% U_3O_8 and 1.6% V_2O_5.

The AEC received royalties on ore produced from its leased properties. The mills, which sold their entire output of uranium for many years to AEC under fixed unit price contracts, purchased ore directly from independent mining companies including AEC lessees to supplement their own ore production.

In the 1954-59 period U.S. reserves of uranium expanded rapidly, largely as a result of large discoveries in New Mexico and Wyoming. As a result the AEC had to limit its uranium procurement commitments. As one measure, mining leases on AEC controlled lands were not renewed, and by April 1, 1962 all mining on these lands had ceased. As ore production from the

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1/ FOB mines at AEC Circular 5 prices. Average grade 0.29% U_3O_8 and 1.5% V_2O_5.

AEC lands might have resulted in increased deliveries under AEC contracts, renewal of leasing was not undertaken through 1970, while AEC's uranium purchase program continued. In 1957, seven ore processing mills drew all or a significant proportion of their ore feed from the Uravan Mineral Belt. Gradually thereafter the production in this area declined, and between 1958 and 1970 the mills at Naturita, Durango, and Grand Junction in Colorado, and at Monticello, Utah, and Shiprock, New Mexico, closed down. The number of uranium-vanadium mining operations in the Colorado Plateau has declined from about 580 in 1960 to 480 in 1966, to 200 in 1970. Recently, there have been two mills in operation equipped to process the complex uranium-vanadium ores of the Uravan Mineral Belt for recovery of the two metals. They are located at Uravan and Rifle, Colorado. Both are owned by Union Carbide Corporation. However, the Rifle mill was closed the first of August, 1972. With restoration of facilities destroyed by fire, the mill at Moab, Utah, owned by Atlas Corporation could again treat uranium-vanadium ores.

3. Objectives of Leasing

The programmatic reason for withholding the AEC-controlled lands from production, as noted above, no longer exists. The objectives that can be advanced by prompt renewal of leasing are as follows:

(a) It should obtain the greatest yield of valuable resources of uranium and vanadium from AEC lands by getting production underway while facilities needed for support of mining

operations are still available. Most important are facilities to process the ore. However, electric power, supplies, transportation, and community facilities also are significant factors. If leasing is too long delayed, and production facilities should shut down, a reduction in the quantity of economically recoverable reserves could occur, both from the AEC lands and other mining lands as well.

(b) It will encourage further exploration and the development of new ore reserves to meet the large long-range requirements of uranium for nuclear power. The leasing of the AEC lands will improve the prospects for continued mill operation, and thereby improve the climate for exploration throughout the district. Presently known reserves of uranium ore in the U. S. are estimated to contain about 273,000 tons of uranium oxide (U_3O_8) producible at $8 per pound. Nuclear power plants are projected to require 216,000 tons of U_3O_8 for the period 1972 through 1980, and 484,000 tons through 1985. New reserves have been developed in recent years at a high rate. Net additions to reserves were about 177,000 tons in the 4 years 1968-71. However, an increased exploration effort and full recovery from developed reserves are both needed in view of the large forward requirements.

4. Action Required for Leasing

No legislative action is required for the AEC to initiate a leasing program on the mineral lands it controls. It issued some 50 leases on these lands in the late 1940's and 1950's, and discontinued leasing only when it became necessary to limit Government uranium purchase commitments.

On November 10, 1970, the Commission published in the Federal Register for public comment a proposed revision to Domestic Uranium Program, Circular 8 setting forth the regulations concerning the leasing of certain lands controlled by the Commission. The changes proposed were for the purpose of updating the Circular and recognizing the change from a government to a commercial market for uranium. Analysis of the comments received indicate that the Circular could be published when appropriate in the Federal Register in final form. The AEC has yet to establish the detailed provisions of the lease program most of which will be incorporated in the terms of the lease agreements and in bid invitations.

Lease agreements will include specific and detailed stipulations designed to provide protection for the environment, and minimize the adverse effects of mining operations. These stipulations are discussed in Appendix C. While it is not felt that this leasing program has the potential to cause a significant adverse effect on the quality of the human

environment on either a local or wider area, nevertheless the program is a matter of widespread interest in western Colorado and eastern Utah.

5. Area Description

The Uravan Mineral Belt, in which most of the withdrawn acreage is located is in semi-arid country which, in an unimproved state, supports a sparse vegetation common in many areas of the southwest. Normal precipitation is 12 to 16 inches per year except for the Elk Ridge tract in Utah which usually receives in excess of 16 inches yearly. Approximately 5 to 6 inches falls in storms of short duration but high intensity in spring and summer months. The topography is generally one of high plateaus or mesas cut by deep canyons which open into broad valleys. From the mesa rims, the land frequently drops vertically a hundred feet or more to erosion slopes of broken rock continuing to the valley floor. The relief is usually several hundred feet to perhaps 1,000 feet or more in some areas, the result of wind and water erosion over the centuries. Much of the early prospecting was along the rims of these canyons, and a large number of mines were located along the outcroppings of favorable formations. Access to many of the mines has been through adits driven into the sides of these steep slopes. In other cases where ore was located well back from the rim, access has been achieved through either vertical

or inclined shafts. Relatively little ore has been produced from open pits, which were generally shallow and limited in areal extent.

The AEC holds about 24,600 acres of mineral lands of which 21,400 are in the Uravan Mineral Belt. As of October 15, 1971, about 626,600 acres of lands in the Uravan Mineral Belt were held by private enterprise for uranium exploration and mining. Thus, the AEC lands amount to about 3.3% of the holdings of uranium mining lands in this area. (Further detail is given in Appendix A.)

Mining is the primary activity on the AEC lands in terms of gross revenue. During the 14 years from 1948-1962, under the then prevailing price schedule, this ore was sold at an average price of $34.66 per ton, or an average of $2,950,000 per year. This ore was processed in the area to an end product that brought an average of about $6,700,000 per year. Cattle grazing was the next most important activity on the land during that time. An estimated 1800 cattle use suitable areas of the withdrawn land for grazing during 6½ months of each year. Assuming a 90% calf crop, and the 1952-1961 price average for weaner calves, the gain in gross value for 1620 calves during the grazing period is estimated at $62,000 per year, compared to the $2,950,000 sale price for uranium-vanadium ore and the $6,700,000 per year for salable concentrates. During this

same period (1948-62) the total industry production of uranium ore was about 41,400,000 tons. Thus, production from the lands leased by AEC was about 3% of the total.

The establishment of mining claims on public lands does not confer on the controller of the mineral rights the use of the surface (except to the extent needed for mining operations) unless the claims are patented. The controller of an unpatented claim can utilize only that portion of the surface that is necessary for the conduct of mining. Further, the control of mining claims does not extend rights to leasable values such as oil, gas, and coal, or salable values such as sand and gravel in public lands. These commodities are not subject to claim staking under the Mining Law of 1872. Multiple use of the lands has been the usual situation, with grazing and other surface agricultural activities continuing along with mining.

A situation can exist in which the mining rights are divided and the controller of uranium-vanadium claims would have another company exploring for oil, for example, on the same ground under a mineral lease from the Department of Interior. However, the Bureau of Land Management, Department of Interior, in its coal, oil and gas leases, can and does include stipulations for environmental protection. Therefore, environmental controls should be adequately maintained in such circumstances. Similarly, controls can be exercised over mining operations in National Forests.

For mining claims staked on public lands no Federal leases are necessary, and consequently no direct mechanism exists through which environmental controls can be imposed. In such circumstances, except for the need to meet federal, state, and local laws and regulations, a mining company can use whatever production methods it chooses, regardless of the effect on further utility or value of the land.

Little effort was made to control the environmental impact of uranium and vanadium mining in the Uravan Mineral Belt during the past 70 years or so. Nevertheless, the adverse effects have been relatively light. Very few of the mines encountered any appreciable water problems in mining. Consequently, discharge of water to nearby streams was not a serious problem. There is no problem of continued mine drainage after operations cease. The sandstone host rock in which the uranium is found is alkaline, containing from a few percent to 20 percent or more limestone. Thus, mine water is slightly alkaline, and the undesirable acid mine waters which frequently occur in coal mining from oxidation of sulfur, do not occur in uranium mining in this region.

Outside of the disturbance of the surface in the course of exploration and mining, and the adverse effects of abandonment of some mines without proper protection and cleanup, there have been no permanent adverse effects from uranium-vanadium mining on the ecology of the Uravan Mineral Belt area that have been identified.

On the other hand, surface disturbance has been widespread, and it affects scenic values. Milling operations have resulted in accumulations of tailings containing low level radioactivity. Most of the inactive tailings piles in Colorado have now been covered and seeded in accordance with state requirements.

6. Description of Proposed Lease Tracts

These lands are located mainly in Mesa, Montrose, and San Miguel Counties of Western Colorado. A few tracts are located in San Juan County in southeastern Utah, and in McKinley County in northern New Mexico. The area that can be made available for leasing is about 77 percent of the 50 square miles covered by withdrawal orders. The other 23 percent is covered by mining claims or other entries which existed at the time of withdrawal. The AEC mineral lands, as shown on the maps in Appendix B, have been divided into units for convenience in identification of specific areas under discussion. The prefixes of the unit numbers indicate the State and locality of the unit, i.e., Unit C-JD-5 indicates that the tract is in Colorado, in the Jo Dandy locality, and is tract or unit number 5. A number of units with the same prefix are adjacent to each other. The number of mineral leases to be issued may exceed the present number of units.

A few of the locality names used in identifying lease tracts are: Club Mesa (CM), Atkinson Mesa (AM), Spring Creek Mesa (SM), and Slick Rock (SR).

The withdrawals of land by the Government were frequently in areas in which many claims had already been staked, and on which intensive exploration and mining activity has now taken place. Consequently, the lands remaining under AEC control, and now under consideration for leasing once again, are in many cases cut up into irregular patch work pieces by privately controlled claims, and bordered by additional private claims in ground adjoining the withdrawals.

B. ANTICIPATED BENEFITS

1. The existing reserves on the AEC-controlled lands represent slightly more than a 500 ton per day ore supply for a mill for a 5-year period. As the properties are not fully explored, it is to be expected that further ore will be found, possibly several times the presently known reserves. This reserve will augment the limited supplies from privately controlled mines and is expected to extend the life of uranium-vanadium mining in the Uravan Mineral Belt by at least 5 years, and more likely for 10 to 20 years depending on further ore discoveries. By supplementing other ore supplies, the leasing program will help to assure the maximum recovery and utilization of the economically available resources of uranium and vanadium from the area.

There is no shortage of uranium in the U.S. at the present time, and the current over-supply is expected to persist for several more years as a result of delays encountered in getting new nuclear power plants operating. However, a lead time of 3 to 5 years is expected before lands to be leased by AEC can be

explored, developed, and brought to full production. Therefore, leasing these lands in the near future is important to continued production at a viable rate, and to provide a climate for continued orderly development of the resources of the Uravan area.

2. The production of the ore from AEC-controlled lands would bring substantial revenues in royalties and bonus payments to the Government.

3. The mining and milling operations would provide substantial Federal, State and Local taxes.

4. Many of the lease tracts can be mined through old workings on them, or by entry through existing mines on adjacent ground. Thus, the amount of additional surface disturbance which will result from further mining in these areas should be less than if the same production were to be obtained from a new area. The known ores on the lease blocks are higher average grade than current production in the U.S. Thus, fewer tons of rock must be mined from the leases than from other areas for an equivalent production of metal values. Therefore, the net effect should be to minimize overall surface disturbance. The controls that will be included in the terms of the leases will also serve to minimize environmental effect. The experience gained on these leases could be useful in demonstrating reasonable and practical measures which can be used to permit recovery of mineral values, consistent with the other benefits from multiple use of the land.

5. The mining industry contributes to the building, maintenance and improvement of roads which are available for the use of others, thus contributing to agricultural and recreational access, and multiple use of the lands. Electric power demands of the mining and milling industries provide an important part of the base load of the utilities, making for better electric services to the communities also.

6. The leased lands should help to provide continued employment for about 1300 people in the mining and milling industry and provide financial benefits to several thousand more in the general area.

The economy of the San Miguel Basin, in which most of the AEC controlled lands are located, is dependent to a large degree on the mining of uranium-vanadium ores. Appendix D contains information on employment, sources of revenue, taxes, recreational usage and availability of community facilities derived from studies by AEC, Arthur D. Little, Inc., and the Denver Research Institute. /1,2/

These studies indicate the following:

(a) In the San Miguel Basin 75% of the economy in 1970 was derived from mining.

(b) Uranium and vanadium production account for about 70% of the value of the minerals produced, and about the same percentage of the basic industry employment.

(c) Mineral assessment represents about half the Basin's assessed valuation for tax purposes.

(d) The area population is declining, and community facilities are adequate for whatever increase in employment levels might be anticipated from leasing AEC lands.

(e) Recreational and agricultural uses of lands in the area are limited.

(f) The decline in economic activity from the early 1960's now appears to have leveled off, and is expected to stay at about the present level indefinitely, barring major external stimulus. One such major change would be exhaustion of uranium reserves available to the Uravan mill to the point where it would cease operations. This is a possibility in the next 2 to 5 years, and would seriously damage the Basin economy.

7. The uranium-vanadium ores of the Colorado Plateau remain the largest source of vanadium production in the U.S.

There are other domestic sources which produce limited quantities of vanadium, such as by-product treatment of slags from electric furnace phosphorus. However, without the Colorado Plateau ores the U.S. would have to import the bulk of its vanadium requirements thus adding to its balance of trade problems. The largest foreign vanadium producing country is the Republic of South Africa.

Vanadium has important uses in a variety of alloys. It is an important ingredient of high strength structural steels, tool

steels, stainless steels and some non-ferrous alloys. It is used as an oxidizing catalyst such as in conversion of sulfur dioxide to sulfur trioxide, a step in manufacture of sulfuric acid, and also has many minor uses.

C. CHARACTERIZATION OF THE EXISTING ENVIRONMENT

1. Present Land Uses

Land use in the region has historically followed multiple use patterns; mining and grazing are the predominant uses. Agriculture is carried on in nearby areas but not generally on uranium lands. Forestry is predominant only in two areas, in the National Forest - Elk Ridge area, and in the Hideout Mesa area. All of the lands are used as wildlife habitat to some extent, and recreation activities on the lands include big game and small game hunting, rock hunting, and scenic sightseeing. The withdrawn areas have been the locale of various oil and gas exploration leases, but to date no producing wells have been brought in.

(a) Range and Livestock

It is impossible to estimate the number of livestock using each area because the withdrawn units are only small portions of rather large allotments. Approximately 1800 cattle graze the entire area involved in the AEC withdrawals. These allotments supplement year-around ranching operations by providing winter and spring grazing.

Potential problems for the range interests that could arise as a result of mining are abandoned open drill

holes and mine shafts, disruption of fences, reservoirs, and springs, and unnecessary destruction of vegetation.

While these have been real problems at times in areas where grazing and mining overlap, they should be eliminated from the AEC lease units by stipulations designed to provide protection to the rancher with grazing allotments in the withdrawn lands.

(b) Wildlife

Wildlife present on the units include mule deer, elk, chukar partridge, blue grouse and mourning dove. The sites vary from very marginal to excellent wildlife habitat and the minimal disturbance of the mining activity noted will leave no significant effect on the habitat of these creatures.

No rare or endangered species of birds, fish, or reptiles were found on the lease sites. Three unusual subspecies of mammals of restricted distribution were noted. They are the White-Throated Woodrat (Neotoma albigula brevicauda) on the mesas east of the Dolores and San Miguel Rivers, and the Aberts Squirrel (Sciuous aberti navajo) and the Northern Pocket Gopher (Thomomys talpoides durranti) in the Elk Ridge area of Utah. Special stipulations will restrict destruction of nesting areas and feed trees in these areas. The wildlife biologist mentioned the possibility that the spotted bat (Euderma maculata) which is considered extremely rare could exist in the lease areas, but so little is known of its habits

that he concluded it was impossible to draw up stipulations for its protection. According to the "Red Book" of the Department of Interior only about 15 specimens have been collected since the species was first described. The distribution is inferred from one or two records from each of the southwestern states and a few from Mexico. It has been found as far north as Montana and Idaho. Apparently limited primarily to the Ponderosa Pine and Pinon Pine belt of the southwest, it probably always was rare. /3/

(c) Recreation

Throughout most of the withdrawn lands there is very little potential for the usual recreation development. In the Outlaw-Calamity Mesa area of Colorado and the Elk Ridge area of Utah a notable exception is the deer and elk hunting available. Mining in these areas over the past 20 years has not affected the quality of hunting. It has been pointed out that the surface disturbance from mining has negligible effect on the forage and it is apparent that the game have coexisted with the mining.

The recreational use of the Dolores River is being considered, and the BLM Scenic River Proposal for this area is an attempt to develop this resource. Lessee operations, as restricted by the lease stipulations, will not adversely affect the use of the river, and portions of some withdrawn lands close to the

river will be excluded from the lease tracts to preclude their use in connection with mining activities.

(d) History

Some of the proposed lease units have been the scene of historic explorations of the southwest as well as minor events in the Ute Indian episode. While there are interesting historical accounts of these events, there are no tangible remnants of this history to preserve and thus no significant impact by the proposed mining.

(e) Archaeology

Numerous prehistoric Indian Ruins are known generally to the south of the withdrawals. These represent occupation by the Anasazi between 500 and 1300 A.D. A few scattered minor ruins were found on some of the lease units and there is a possibility others may be encountered. A stipulation to prohibit excavation of such features will assure the opportunity for proper evaluation and recording of such discoveries.

(f) Soil and Watershed

With the exception of Elk Ridge, Utah, the normal yearly precipitation for all other units ranges from twelve to sixteen inches. Because of the infrequent and intense storms typical of the area, the ground cover throughout this region is fragile, and, even without disturbance of man, is very susceptible to both wind and water erosion. The nature of the soils and the climate make reseeding

difficult, but this will be required as necessary where significant areas of cover are removed. Close supervision of road work will help to limit the area disturbed and provide for proper drainage structures.

Besides the impact on the ground cover, the other major concern will be prevention of contamination of the drainways by siltation or solution, and prevention of stream contamination by silt. While this is happening to a large degree in nature, any disruption of the ground cover or drainage of surface water through mine piles will intensify the condition.

The problem of stream contamination from uranium ores relates principally to the isotope radium-226. It can reach the streams either by direct deposition of solids containing radium-226 or from leaching of the isotope by surface water. When fine grained radium-bearing solids such as mill tailings enter a stream, a high liquid-to-solid ratio exists and significant radium can be leached, even though the mineral is relatively insoluble. Such is not the case with mine waste dumps. These piles contain large fractions of coarse rock much of which is excavated from areas of little or no mineralization. Consequently, the radium concentration is much lower than in ore. Moreover, rain water percolating through them would not leach significant amounts because of the very low liquid-to-solid ratio. If dumps are out of reach of peak stream flow, and surface runoff is directed around them, no significant radium contributions to the streams would result. The very fine clays contained in the

ubiquitous sandstone of the region absorb heavy metal ions by ion exchange. Water percolating into the ground quickly loses its radium content.

(g) Forestry

Timber cover, where it exists, consists principally of pinon and juniper with small areas of scattered ponderosa pine. In none of the proposed lease tracts, with the exception of Elk Ridge, Utah, does the forest resource have any commercial value.

There is some aesthetic value, but the chief value of this cover is its function in reducing runoff. Wherever possible removal of trees for road construction will be avoided. Where tree removal is necessary all debris will be disposed of in accordance with standard forestry practice.

(h) Oil and Gas

Oil and gas leases have been issued by the Department of Interior on some of the lands included in the AEC withdrawals. Under the terms of these leases the lessee agrees that his activity will not interfere with any operations on the AEC tracts. To date no oil or gas discoveries have been made on the subject tracts. Whether or not there are any future wells, there should be no conflict between these land uses.

(i) Use of Water and Other Resources

Water used in Uravan Mineral Belt mining operations is from sources which vary with the particular mine and its geographic location. While most mines are considered dry in that water

does not constitute a mining problem, some water accumulates in mine workings and is collected for use in mining. Other sources are nearby towns' water supplies, springs, rivers, small ponds, and reservoirs. The quantity used is a function of the number of people involved and the number of tons of ore produced, although the relationship is not necessarily linear.

Domestic Use

Mine personnel live in communities and not at the mines. Therefore demand for domestic use at the mine sites is not significant. As industry employment is expected to remain at about current levels, water requirements for domestic use in area communities should not increase.

Mine Use

Water is required for underground drilling to prevent dust from becoming airborne and to remove cuttings from drill bits. Some mines have underground sumps where water collects and is then generally pumped to a surface tank. When no such supply is available, water is obtained from the closest source and hauled to the mine in barrels or tanks.

Surface Drilling

The rock formations in the Uravan Mineral Belt are usually dry and very little drill water is required. Cuttings are removed from the drill hole by air, but when water is encountered in the drilling, generally at some depth, it becomes necessary to haul water for cuttings removal.

Quantity of Water Used

The small quantities of water for domestic use and surface drilling, are not included in the following data. The major use of water is for underground drilling. The following operating conditions are considered appropriate for maximum production rate anticipated for the entire Uravan Mineral Belt including the AEC lands:

350 drilling machines in operation
35 gal. water per machine per day
26 days operation per month

These figures indicate that 318,500 gal/mo. would be used. But it is further estimated that 70% of this would be obtained from the mines, leaving 95,500 gals, (about a steady 2.6 gallons per minute) to be brought in from other sources. This quantity of water would sustain production in the 40,000 tons per month range, about the maximum that could be anticipated for the Uravan Mineral Belt as a whole. Usage on the AEC lands may be about one-third of the total. Such requirements would not have a noticeable impact on the available water resources.

(j) Other Resources

Very little timber is used in uranium mines in the Uravan Mineral Belt and adjoining areas. The small amount used is acquired from sources outside of the mining area. Most ground support is provided by roof bolts or pillars of ore or waste. A survey of 1968 mining costs at several selected mines operated by Union Carbide Corporation in the Uravan

Mineral Belt revealed that ground support costs ranged from $0.05 to $0.09 per ton of ore produced, illustrating that the amount of steel and timber used in mines of this area is not significant.

(k) Indian Dwellings

Unit NM-B-1 in McKinley County, New Mexico consists of Sec. 11 and portions of Secs 3 and 13, in Township 13N, Range 11W. Presently, Bureau of Indian Affairs administers all surface rights, and AEC has mineral rights withdrawn. There are a few Navajo Indian dwellings on Sec. 11 of this proposed lease tract, and also some prehistoric Indian mounds. Section 3, while it has no homesites, is reported to have some prehistoric Indian mounds. It has no established ore reserves, and a limited potential. It has been decided that Sections 3 and 11 will not be leased. (See maps and aerial photograph in Appendix B.)

2. Proposed Land Uses

(a) Dolores River

The Bureau of Land Management is considering a scenic river proposal for the Dolores River from Cahone to Bedrock, Colorado. The only place this coincides with the proposed lease tracts is in the vicinity of Slick Rock, where the Dolores River cuts through units C-SR-13, 13A and 14.

Aside from the visibility of some mine workings from the river, the mining activity in this area should have no

other impact on the recreational use of the river. Through controls on the dumping of waste rock, and by removing from the lands to be leased certain areas close to the river, the visual impact can be minimized. Evidence of mining will remain, however, as there has been uranium-vanadium ore production from private claims in this area since the turn of the century. The old mines of this region are considered by many as historical attractions. The site of the Slick Rock mill is directly across the river from the southern boundary of C-SR-13A.

BLM has suggested that portions of Units 13, 13A, 14 and 19 along the river and below the ore horizon be protected from surface disturbance. This will be done.

(b) San Miguel Project

The Bureau of Reclamation's proposed San Miguel Project involves a series of dams, reservoirs, and canals. The only portion of this project where there is even a remote chance of any impact from the leasing program is in the Paradox area. Two canals on either side of State Highway 90 are planned to provide irrigation water to about 7,000 acres on the floor of Paradox Valley which would become farm land. The mining activity will be confined to the upper rims and fault blocks on the flanks of the valley from 200 feet to 1,000 feet above this potential farm land. Consequently, no impact can be foreseen on Paradox

Valley other than the appearance of a few more mine workings on the rims above the valley. It is noted, however, that the San Miguel Project, because of its very low benefit-cost ratio (0.89:1) and very high cost per acre ($1,310) appears to have low priority. Possibly it may not reach construction stage in the Paradox area before the completion of the AEC's proposed leasing activity.

III. ENVIRONMENTAL IMPACT

A. Assessment of Impact, and Proposed Control Method

The AEC has on its Grand Junction, Colorado staff, and the staff of its service contractor, Lucius Pitkin, Inc. experts on mining and geology who have extensive knowledge of the AEC-controlled lands and the exploration and mining techniques needed to produce ore from them.

In order to obtain assistance in other disciplines pertinent to the assessment of the environmental impact of the proposed leasing program, AEC requested the services of the Bureau of Land Management, Colorado State Office. The BLM is responsible for management of 60 percent of the Nation's Federal lands and administers the Federal laws pertaining to these lands. However, under the Mining Law of 1872, it does not have authority to exert direct control of mining for metals on claims staked on public lands.

On April 2, 1971, the U.S. Atomic Energy Commission and the Bureau of Land Management, Colorado State Office, entered into a Memorandum of Agreement calling for BLM "to make a surface protection examination and formulate stipulations to protect the surface resources and reclaim the lands on AEC withdrawn lands in Colorado." The agreement was revised on May 3, 1971, to include lands in New Mexico and Utah. BLM performed the work with a multi-disciplined team which included experts in various fields concerned with the environmental effects of mining. (See Appendix C.)

Because several of the withdrawn blocks are within National Forests, administered by the Department of Agriculture, the Forest Service was asked to participate in the survey and to make recommendations for stipulations on lands for which it has surface management responsibility.

It was the judgment of the multi-disciplined team that examined the lands withdrawn by the AEC that surface values and sound multi-use management practices can be maintained if the recommendations and stipulations as set out in the report are adhered to. These recommendations and stipulations are listed in their entirety in Appendix C.

The BLM report is available on request at the Grand Junction Office, USAEC, Grand Junction, Colorado. Copies will be placed on file in the County libraries of all Counties in which the AEC lands are located.

With a few exceptions, which are discussed in Appendix C, the AEC will provide, through stipulations in the leases, the measures recommended by BLM and required for environmental protection. The leases will require adherence to applicable Federal and State regulations on environmental quality, safety, air and water quality, including AEC standards for protection against radiation /4-17/. The leases will also require approval by AEC of exploration and mining plans of each lessee to assure that provisions for environmental protection are adequate.

B. Probable Environmental Effects

1. Surface disturbance

Some surface disturbance of the land is an unavoidable result of mining. Because the ore horizon is usually at considerable depth on the AEC lands, most of the mining will have to be done by underground methods. The orebodies are generally small and scattered, underlying a small proportion of a lease block area. The area required for surface activities will be relatively small, generally under 1% of the 40 square miles available for leasing.

In order to develop the presently known mineralized areas of the withdrawn AEC mineral lands, it is estimated that about 40 new underground mine entries with associated surface plants and two or three open pit mines will be required. Open pit mining would probably be practiced only in the tract in New Mexico and in a few areas in the Slick Rock District in Colorado. In addition, some 35 to 40 existing underground mines may be reopened. This would amount to about one mine on each 300 acres of land. Mining could be expected to begin in the period from 6 months to 5 years after the leases are executed. Individual properties are anticipated to remain in operation from 3 to possibly 20 years. In addition to the mine entries and surface plant area requirements, some surface exploration will be required, with associated exploration drill roads. Surface drilling will be held to a minimum because of the economic as well as the ecological aspect.

(a) Excavations

The excavations for the estimated 40 underground mine entries would require disturbing the surface of less than 1/10 acre for each. Three open pit mines would disturb the surface of about one to two acres each, or a total surface disturbance of 10 acres or less.

In connection with the underground mines a vertical shaft usually requires the least surface area. When an adit or an inclined shaft is used, the surface must be excavated far enough underground to penetrate solid rock and support the opening. The horizontal extent of this surface excavation will vary from 10 to 200 feet depending on the nature of the rock and the degree of inclination of the entry. These installations remain for the life of the mine or as long as the portal is operable.

(b) Waste Dumps

The mine waste dumps for underground mines would alter the surface appearance of a little more than one acre per mine, or about 50 acres total. This represents the surface area that will be covered by waste rock removed from the mine in the course of the underground mining operation and will be void of vegetation. The only protective measure that can be taken to contribute to the restoral of these areas would be stockpiling existing topsoil in the beginning, then contouring and covering the dump with the stockpiled topsoil and seeding at the end of the operation. In most of the lease units throughout

the Uravan Mineral Belt, however, the topsoil is thin, the rainfall infrequent, and vegetation is quite sparse to start with. For open pit mines, the lessee will be required to contour overburden piles into the landscape, and backfill as much as possible in mined out areas as mining progresses, covering and seeding after contouring where sufficient topsoil is available.

(c) Surface Plants

At each mine site there will be a small area required for the surface plant, which includes ore bins, hoist house, change house, ore stockpile area, mine office, equipment parking area, and maintenance shop. These sites would vary with the size of the operation and average about 1 acre per mine or 48 acres total surface disturbed.

(d) Drill Roads and Access Roads

The effect of the access roads on the environment would be negligible in most cases, since many of the lease units already have access roads to the mineralized areas, and some drill roads would also be used for access. New access roads required would only amount to a small fraction of the roadway areas required for surface drilling. The maximum roadway area for drill roads to drill sites on 200 foot centers, assuming a 10-foot roadway, would be about 2 acres per section of land, or a total of 96 acres. Due to the large amount of exploration already done on the lease tracts, it

is estimated that surface drilling would require about 60 acres of roadway.

(e) Correction of Existing Conditions

On some of the lease blocks as a result of previous mining activity undesirable conditions exist which could be readily corrected. These include abandoned equipment and vehicles, small pits and waste dumps which could be filled or graded. Where appropriate, the AEC intends to include provisions in leases under which the lessee will agree to correct such conditions existing at the time the lease is signed.

2. Water quality

The AEC controlled mineral lands are in semi-arid areas. In most cases the ore horizon is well above the water table, and no appreciable amount of water is likely to be discharged to the environment from the mines. In the event any water discharge becomes necessary, the lessee will be required to treat such water to meet applicable standards and to maintain adequate records to show that waters released from control of the lessee meet the standards. Certain portions of the lease blocks adjacent to the Dolores River will not be leased in order to preclude the use of these areas in connection with mining.

3. Air Quality

Mining activities will add some minor amount of pollutants to the air in the immediate vicinity of the mines, mainly dust and exhaust fumes of engines, and radon. Radon gas in mine ventilation exhaust is very quickly dissipated in the atmosphere, and has not been a

problem on operating mines. These factors are of little significance off the mine site. Increased traffic on unpaved roads will cause some dust, but constitutes a minor nuisance of a type common to the area.

4. Secondary Effects - Uranium Ore Processing

Since uranium ores are processed in mills located in the same general area as the mines, the potential environmental impact of milling was also considered. The mills produce high-grade concontrates of uranium and vanadium for sale. Waste products of the operation are in the form of liquid effluents resulting from dissolution of metal values from the ore, and finely ground solid tailings. The solid tailings, which contain about 85% of the radioactivity originally in the ore consisting of radium and its radioactive decay products, must be impounded permanently near the mill in a manner to preclude escape to the surrounding area by wind or water erosion. Liquid effluents may also be impounded for disposal by evaporation, or may be treated to reduce the concentration of radioactive and other undesirable constituents to acceptable levels before being released.

It cannot be determined at this time that any new ore milling facilities will be constructed as a result of the leasing of AEC controlled lands. If such a plant were to be built, the company would have to meet applicable Federal and State environmental requirements. Milling operations are subject to the regulatory control of the AEC except in those states which, by agreement with AEC, have assumed regulatory responsibilities. Colorado is an agreement state and licenses the uranium mills within the state. In all cases the mills must meet the standards for the protection

against radiation for activities under licenses issued by the AEC (10 CFR Part 20). /17/

Most of the older uranium ore processing mills on the Colorado Plateau were located close to rivers from which they withdrew process water. Studies during the 1950's by the Public Health Service indicated unacceptably high radium-226 concentrations in river waters below the mills as a result of effluent discharge. The situation was particularly acute in the Animas River below Durango, Colorado where a mill was discharging untreated liquid and solid wastes directly to the river. Measurements showed that crops irrigated by water from the river downstream from the mill contained, on the average, about twice as much Ra-226 as in similar crops upstream of the mill. Alfalfa and hay tended to concentrate Ra-226 more than other crops. Algae, aquatic plants and fish were also shown to have higher Ra-226 content below the mill, although the concentrations in fish were not high enough to be considered significant in terms of human exposure. /18/

As a result of AEC and Public Health Service actions, the undesirable conditions found earlier on the Animas River had been brought under control by 1959, and in some other areas in 1960 /19, 20, 21/ by the mill operators. Continued monitoring by PHS and the Environmental Protection Agency has demonstrated that control has been maintained. /22, 23/

As these monitoring studies have demonstrated, radiation exposures to the public as a result of solution discharges from uranium milling operations can be successfully controlled so that they present no significant short-term hazard.

Whether or not any long-term hazard exists from low level radioactivity as a result of the existence of mill tailings resulting from ore processing, so long as they are contained at the site, is a matter on which various authorities differ and probably will continue to do so. There is no disagreement, however, that tailings should be confined both during and after cessation of milling operations so that they will not become a public nuisance, and will not spread to streams, or surrounding land areas through wind and water erosion. This presents no serious technological problems, and under these conditions no public health problems are evident. The State of Colorado regulations for stabilization of tailings became effective January 26, 1967. Several studies by the State of Colorado, the U.S. Public Health Service, and AEC indicated no significant hazard to the public from Radon-222 emanating from tailings piles located at mill sites. /24/

During the 1950's and through 1966, sand tailings were removed from some mill sites, particularly in Grand Junction, Colorado, for use as fill in construction projects. In Grand Junction tailings were used extensively under and around foundations of houses, schools and other habitable structures. This practice was stopped in 1966, however, by the State of Colorado Department of Public Health. The problems of determining the radioactivity

exposure to the residents, and the corrective measures that should be undertaken are still being investigated. /24/ In light of this recent experience and the publicity it has received, the states can be expected to exert much tighter control over any removal of tailings from mill sites in the future. The State of Colorado regulations require that prior written approval of the Colorado State Department of Health be obtained before any tailings material is removed from any active or inactive mill. Stabilization of tailings at inactive sites has been completed at six sites in Colorado since passage of these regulations.

The inactive tailings piles at the following locations have been stabilized by contouring and earth covering where needed, and establishment of vegetative growth as required in Part VIII of the Colorado Rules and Regulations Pertaining to Radiation Control:

1. American Metals Climax, Inc., Grand Junction, Colo.
2. Foote Mineral Co., Durango, Colo.
3. Colorado Ventures, Inc., Gunnison, Colo.
4. Foote Mineral Co., Naturita, Colo.
5. Union Carbide Corp., old Rifle plant, Rifle, Colo.
6. Union Carbide Corp., Slick Rock, Colo.

Active tailings piles are located at Rifle, Canon City, and Uravan, Colo. The tailings at Maybell, Colo., have not been covered pending possible reprocessing.

The mills of Union Carbide Corporation at Uravan and Rifle, Colorado, have a capability of processing about 1500 tons of uranium and vanadium bearing ore per day on a continuous basis. The company has publicly announced its willingness to purchase up to half its mill feed requirements from production of ore from AEC leases, if offered, subject to standard amenability tests.

The known reserves on the AEC controlled lands of nearly a million tons are equivalent to a production rate of 500 tons per day for 5 years. Thus, it can be seen that available mill capacity is adequate for the presently known reserves.

Some of the independent mining companies in the Uravan Mineral Belt would like to see another mill built to provide an alternative outlet for their ore. Whether or not a new mill will be built will depend, in part, on the outcome of competitive bidding for AEC leases, and whether any company can get control of sufficient reserves for a new mill.

C. Extraordinary Adverse Environmental Effects

No extraordinary adverse environmental effects appear to be a possible result of the proposed leasing of AEC-controlled mineral bearing lands.

IV. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

The unavoidable adverse environmental effects involve surface disturbance. They will be minimized by strict enforcement of lease stipulations for environmental protection. (See Appendix C.)

A. Excavations

Wherever ore is removed from the ground an unavoidable opening remains. Because of the depth and irregular nature of the ore deposits most of the AEC lease units will be mined by underground methods, and can be expected to require use of relatively little of the surface area. There are a few deposits which will probably be mined by open pit methods. None is expected to involve more that a few acres. Areas of surface disturbance even though properly contoured can be expected to be slow to recover due to the slow growth of vegetation in the dry climate.

The semi-arid conditions over most of the area and the general lack of underground water make it unlikely that any significant amounts of water will be discharged to the environment from underground excavations.

Normal safeguards to prevent surface runoff from entering the mine workings will be required, and stipulations will provide for safely sealing all entries to the mines upon termination of the lease.

B. Waste Dumps

Another unavoidable consequence of underground mining is the accumulation of barren material which must be removed to make the ore accessible. Because of the nature of the material, reclamation of these dumps is difficult. They are generally composed of broken rock in a wide range of sizes. In most cases, grading the pile to blend with the topography should be feasible. Where topsoil is available, covering and seeding may be practicable. Lease stipulations will require such measures wherever feasible and also diversion of the natural drainage around waste dumps to prevent contamination of the runoff.

C. Drill Roads and Access Roads

Some new roads in these areas will be required. These will be chiefly drill roads as there already are access roads to most of the units. The construction of new roads will be kept to a minimum, both from an economic as well as an environmental point of view. Where roads are necessary there will be some disruption of the surface. Stipulations will be included to require proper design and adequate drainage structures to retard or prevent erosion.

D. Total Area Affected

The total surface disturbance from excavations, mine waste dumps, surface plants and drill roads is estimated to be approximately 140 acres, or about 0.6% of the withdrawn area.

V. ALTERNATIVES

The AEC's proposed course of action is to lease the controlled lands on a competitive bid basis, the leases being written to include such stipulations as may be needed for environmental protection as indicated elsewhere in this report.

Alternatives to this plan are relatively few and do not hold promise of less overall adverse environmental impact:

(1) Do not lease, and return lands to the public domain.

(2) Do not lease, and maintain lands in withdrawn status.

In view of the high value of the known reserves, and the good potential for further ore finds on the AEC-controlled lands, Alternative 1 could produce a land rush of considerable proportions. The Federal Government would lose the ability to mitigate the environmental impact on the lands through lease terms. Therefore, it is not a desirable alternative.

Alternative 2 would avoid further metal mining activity on the lands for an indefinite period. It would reduce overall recovery of valuable resources of uranium and vanadium from the Uravan Mineral Belt by advancing the date when mine production is insufficient to support a milling operation. It would defer royalty income to the Government and risk substantially reducing or eliminating such income. Alternative 2 will make it necessary to import vanadium, adversely affecting

our balance of payments. It would also defer corrective action on some undesirable environmental conditions resulting from past mining activity. The impact on communities in the area which are heavily dependent on uranium-vanadium production would be severe.

Pursuing Alternative 2 would result in acquisition of uranium and vanadium by the consumer from some other source. The AEC-controlled lands contain higher grade ores than average for the U. S., and are located in established mining areas. Commercial purchasers are free to acquire their needs from whatever sources are available to them. There is no reason to assume that the sources they select would have less adverse environmental impact than production from the AEC-controlled lands, and it could well be greater.

The use of fossil fuels is not proposed as an alternative to the leasing program. The loss of available reserves and production capability that would result if Alternative 2 were followed would not be sufficient to warrant consideration of a fossil fuel alternative. If the resources in the AEC-controlled lands and nearby areas were not available, uranium production would be increased from other sources. The effect of the leasing program on overall availability of uranium from the viewpoint of the U. S. utility industry would be relatively small, and could not reasonably be expected to influence the decision of any utility concerning methods or choice among available fuels (coal, oil, gas, or nuclear) for generating electric power.

The following illustrations give some perspective on the long range supply and the demand for uranium for nuclear power. Figure 1 shows the range of estimated cumulative requirements as influenced by the timing of introduction of the commercial breeder reactor, and by the availability of low cost uranium (U_3O_8). Figure 1 shows that uranium requirements, in addition to being affected by the availability of uranium at reasonable cost, are also sensitive to the date of commercial introduction of the breeder reactor, a factor that is currently difficult to forecast.[1/] Even a 4-year difference in the date of breeder introduction, from 1986 to 1990, makes a large difference in the long range uranium requirement (through the year 2010).

The reserve level needed to permit orderly production planning is also shown. On a nationwide basis it is desirable to have at any time reserves of a size at least equal to 8 years forward requirements. At the present time the $8 reserves are numerically equal to 10 years forward requirements. However, not all of these reserves are so situated that they can be produced within the next 10 years. The maintenance of an adequate supply of uranium to meet U. S. requirements from domestic sources will require a continuing large

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1/The breeder reactor, now under development, produces more fissionable material than it consumes. It converts thorium or the isotope U-238 (which comprises over 99 percent of the uranium found in nature) into fissionable isotopes of uranium or plutonium, respectively.

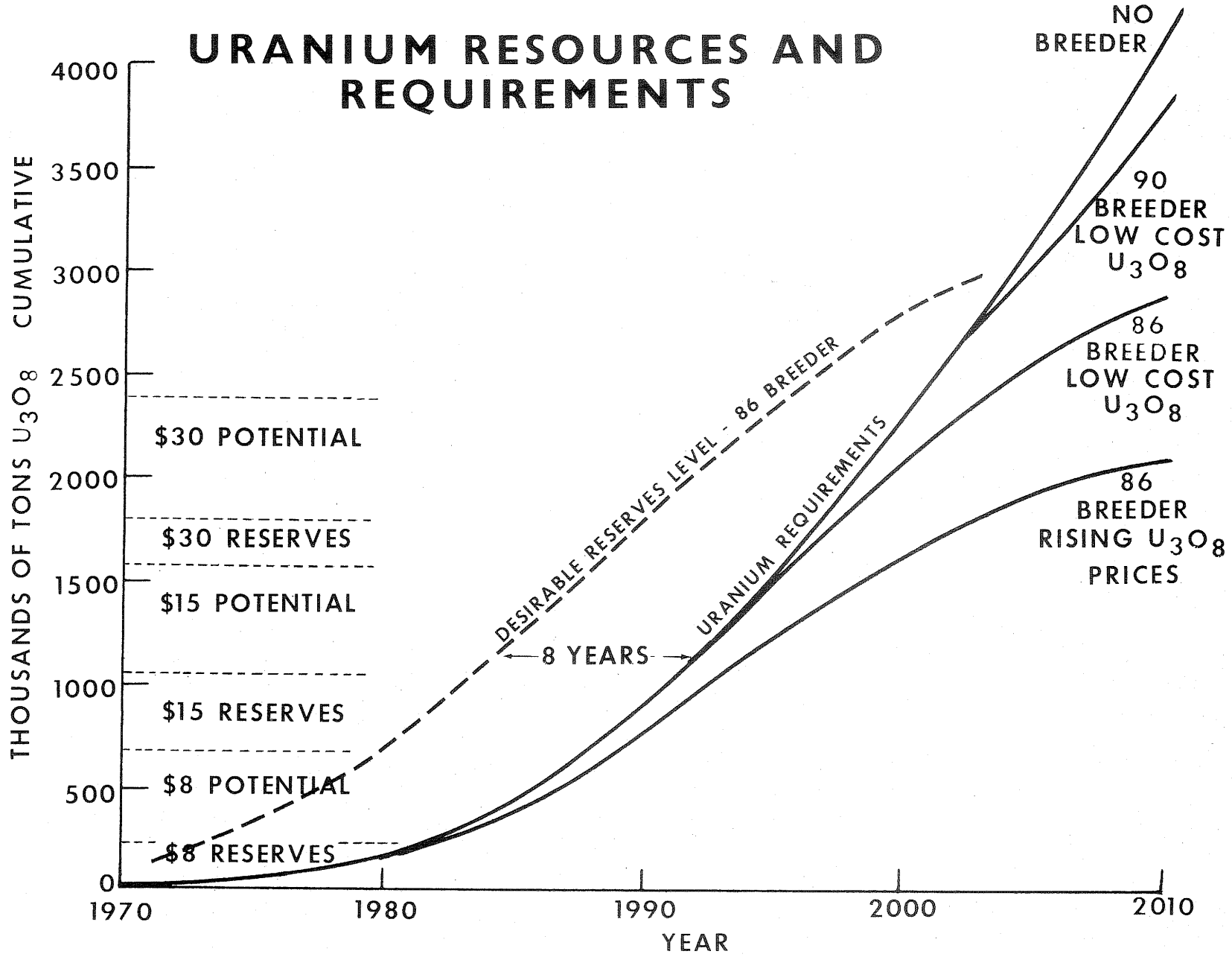

FIGURE 1

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and vigorous exploration program to develop additional reserves, and to find new areas with potential for uranium ore discoveries. The ability of the industry to meet market requirements also depends on a full recovery and production from known reserves. Figure 1 also indicates the January 1, 1972, estimates of uranium reserves and potential at several price levels up to $30 per pound of U_3O_8.

Figure 2 shows on an annual basis past production of U_3O_8 for sale to the U. S. Government and on the commercial market, and the estimated range of forward requirements. The commercial deliveries to foreign purchasers have represented a very small proportion of domestic producers' sales.

In general the supply-demand situation for the non-communist world outside the U. S. is very similar to that within this country. Uranium is currently in over-supply, but within a relatively few years demand will catch up with production capability, and new facilities and increased exploration activity will be needed. Thus, it is not safe to assume that if the U. S. should be unable to meet its own requirements there will be ample supplies available abroad. Figure 3 compares production rates and requirements for the non-communist world.

DOMESTIC PRODUCERS' URANIUM DELIVERIES, PROJECTED U.S. REQUIREMENTS ANNUAL BASIS

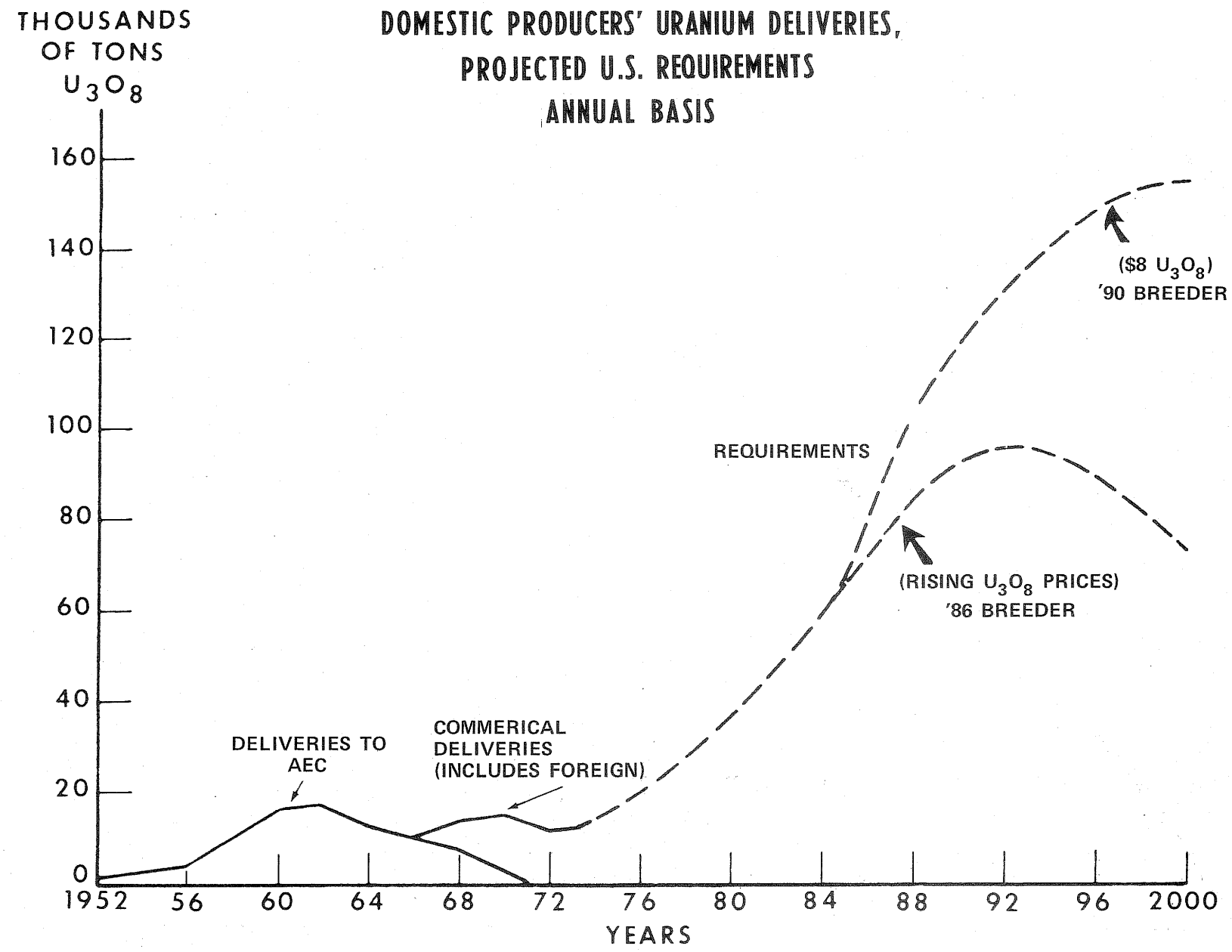

FIGURE 2

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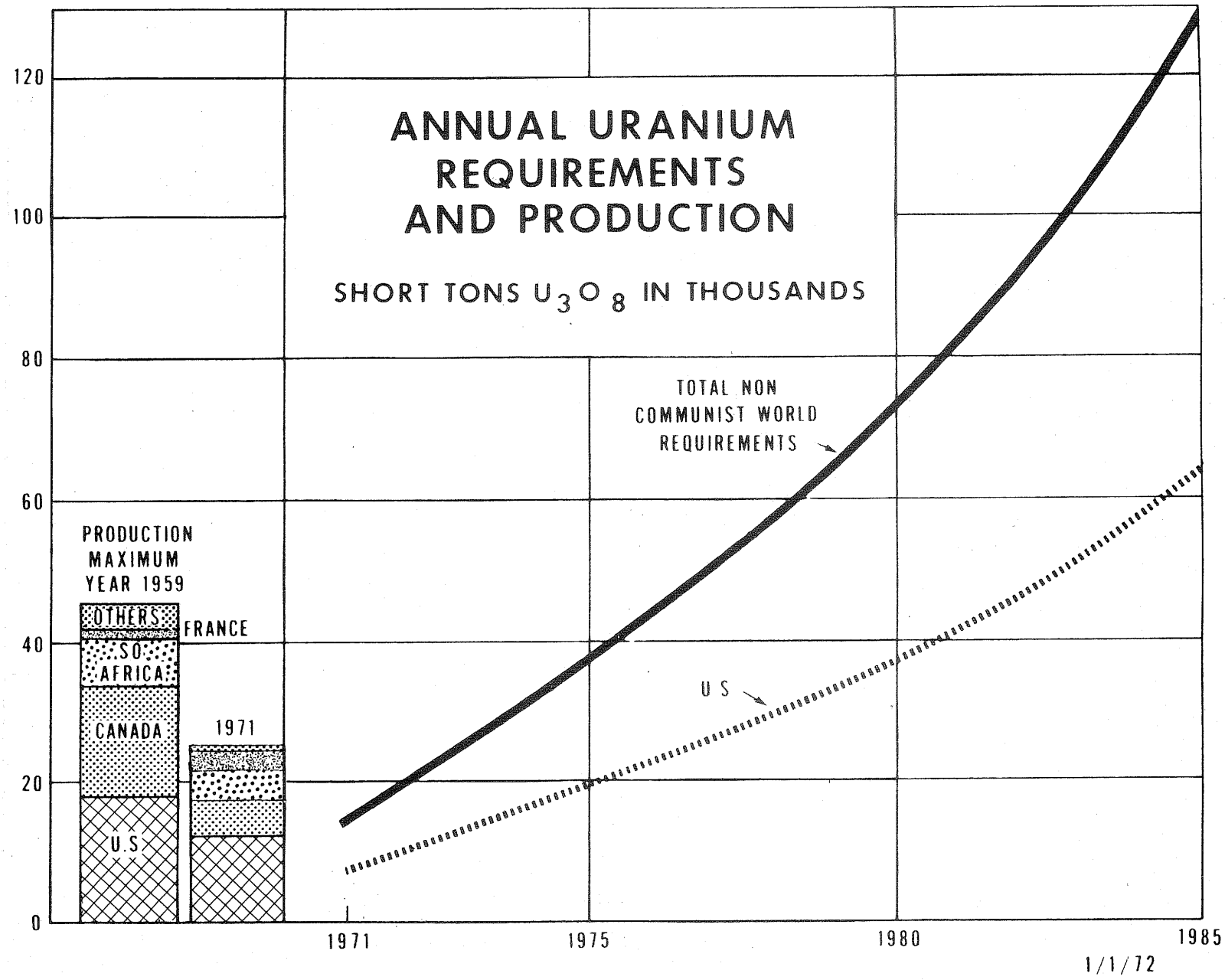

ANNUAL URANIUM
REQUIREMENTS
AND PRODUCTION
SHORT TONS U_3O_8 IN THOUSANDS
120
100
80
60
40
20
0
TOTAL NON
COMMUNIST WORLD
REQUIREMENTS
U S
PRODUCTION
MAXIMUM
YEAR 1959
OTHERS
FRANCE
SO.
AFRICA
CANADA
U.S
1971
1971
1975
1980
1985
1/1/72

FIGURE 3

VI. RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The AEC-controlled mineral lands are located for the most part in areas which have been subject to considerable mining activity over a period of many years. In the Uravan Mineral Belt area, in which about 86% of the AEC lands are located, AEC lands represent about 3.3% of the total held for uranium exploration and mining. Most of the AEC lands have been leased for mining in the past, the leases having been terminated when AEC found it necessary to limit purchase commitments.

The renewal of leasing of these lands will permit the completion of the recovery of the mineral values. It will be an important contribution to the economy of an area heavily dependent on mining, its principal source of income. The leases can be expected to extend the productive life of the area a minimum of 5 years, and probably considerably longer. Other than the uranium-vanadium ores there are no economic mineral deposits known to exist on the AEC-controlled lands.

In terms of long-term productivity other than mining, the areas have very limited current utility or potential. Agricultural use is essentially limited to grazing. The area of surface disturbance by mining on land of interest for grazing is expected to be so small as to be negligible. Similarly, little interference with wildlife habitat appears likely. No interference with recreational uses such as hunting and fishing should result from the mining operations. Some short-term adverse effect on scenic values is unavoidable, but in the long-term, with adequate environmental controls in leases, the effect should be minimal.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The mining activity on the AEC lands will result in the depletion of resources of uranium and vanadium existing in the ground. However, only through production of these resources can their potential benefits be realized. On completion of the leasing program it is expected that the withdrawn lands will be restored to the public domain. Only a small fraction of the surface of the AEC lands necessary for conduct of mining will be made unavailable for other uses either during or subsequent to active mining. Thus, in terms of other beneficial uses of the environment, the irretrievable and irreversible effects should be negligible, or nearly so.

VIII. COST-BENEFIT ANALYSIS

During the years 1948 to 1956, AEC surface drilling in search of uranium ore totaled approximately 5.6 million feet. There were 50 mining leases issued to mine ore found by exploration at Government expense on the withdrawn lands, and the Government received $5,900,000 in royalties on the 1,200,000 tons of ore produced. The value of this ore delivered to the mills was about $41,250,000.

The remaining known reserves in these lands, about 900,000 tons, are estimated to contain 3,000 tons of U_3O_8 and 20,000 tons V_2O_5. The area has a good potential for further ore discoveries, and production could eventually reach several times the presently known reserves. The existing reserves represent a supply of slightly more than 500 tons of ore per day for a mill for a period of 5 years. If this production rate is achieved, the value of the uranium and vanadium concentrates (at say $7 per lb. U_3O_8 and $1.50 per lb. V_2O_5) derived from this ore would be on the order of $18 million per year. Royalties, assuming an average of 6% of this amount, would be over $1 million per year to the Federal Government. The administration of the leasing program will require about 4 man years of effort at a cost of about $125,000 per year once the program is operational. A large part of this effort is expected to be field work necessary to monitor and enforce the lease stipulations relating to safety, environmental protection and interface with other land uses. Thus, in terms of direct dollar return to the Government, the cost benefit ratio is indicated to be on the order of 1:8. Giving consideration to the potential, this revenue might continue for 10 to possibly 20 years.

Equally important, the leasing of AEC lands, by extending the productive life of the mining district, would permit additional reserves to be developed and produced in the mining district outside the areas controlled by AEC. Other mines in the district should produce at least as much as AEC leases.

The maximum recovery of the valuable resources of uranium and vanadium will probably take place if leasing is undertaken in the near future while milling facilities, communities, and other elements of the infrastructure of mining in the area are still functional.

If a new mill were built at a later date, the cost of amortization of the plant would add to processing costs making uneconomic some ores now being produced at a modest profit. It follows that, in the interest of conserving a valuable natural resource, it is necessary to mine out deposits completely and obtain the maximum yield from existing mines. Similarly, to close down operations in a mature mining district before all deposits currently being exploited have been mined out will result in some loss of valuable and irreplaceable resources, which become inaccessible or uneconomic. The degree of loss may be difficult to project as it depends, not only on whether each mine can be reopened at a later date, but also on such factors as future market value of products, inflation, plant replacement costs, supporting industries, and services, etc.

Therefore, while mining depletes an irreplaceable natural resource, once mining operations are underway, failure to carry through and

complete mining of all economically producible material while it is accessible, wastes a natural resource, to both the present and future detriment of the public. In effect, the environmental impact may be compounded because the needed resource may have to be produced by mining elsewhere, for example in a virgin area where the adverse impact on the environment would be much greater than in an established mining district.

The benefits and cost considerations to the states and local communities involved must be looked at on a broader and somewhat less quantitative basis. The value of the uranium and vanadium that can be recovered from the existing reserves on the AEC-controlled lands, when converted into mill products, is about $92 million. About 23% of this amount would be spent locally in wages, salaries, supplies, and equipment for mining and milling. The industry pays substantial taxes to state and local jurisdictions. From combined production of AEC leases and privately controlled mines, total revenues of roughly $40,000,000 per year can be expected, of which about $10 million in wages and salaries would be returned directly to the area, employing about 1,300 people, and providing benefits to a larger number indirectly engaged in supplying goods and services. This primary income may be expected to turn over about 5 times in the general region.

With the special provisions which will be incorporated in the leases, disturbance of the surface of the land should be kept to a

minimum, and in some instances it may be feasible to stipulate in the lease that some of the damage from past mining be repaired, leaving the surface in better condition that it is now. Thus, there should be no residual cost to federal, state, or local jurisdictions for cleanup following cessation of mining operations. Except for the administrative costs already mentioned, we can foresee no significant direct dollar costs to government at any level to offset the benefits noted above.

In terms of recreational usage, many of the highways and secondary roads of the area are a direct result of mining activity. Thus, mining in some areas is directly responsible for also increasing accessibility for sightseeing, hunting, and other recreational uses by means of roads maintained primarily for mining. The limited obvious additional surface disturbance from mining the lands would be balanced to some degree by the benefits produced in terms of increased opportunities for other unrelated land uses. However, the districts in which the mines are located have limited use for non-sporting recreational purposes, due to lack of water, sparse vegetation, and general lack of features of recreational interest.

Based on current and past experience, there appears to be no significant adverse effect on other land uses including grazing (the lands are generally unsuited to other agriculture), recreation, wildlife habitat, forestry, and watershed. The semidesert area in which the mining lands are located is vast, the mineralized

areas are in relatively small scattered tracts, and the surface usage in mining is a relatively small proportion of the mineralized area. The visual impact of past mining activities in the Uravan Mineral Belt on scenic values is not great. Future mining under leases should have less effect.

The proposed leasing program does not set significant precedents in the sense that the land area available for leasing is limited. AEC has no plans for further uranium purchases, and it is highly unlikely that it would ever acquire additional uranium bearing lands.

There will inevitably be environmental costs from leasing, mainly the disturbance of some land surface, with some adverse effects on its use for other purposes during and subsequent to mining. With adequate supervision and control, these effects can be kept to a minimum. The cost in terms of land occupied during mining and thereby unavailable for other use is expected to be less than 1% of the area available for leasing.

The alternative of relinquishing control of the lands and returning them to the public domain offers no advantages, as it would remove the opportunity to minimize adverse environmental effects through lease provisions. The alternative of deferral of leasing would preserve the lands in their present condition, which in some cases could be improved. However, it would defer economic benefits to be derived from production operations, and risk eventual loss of benefits.

Consumers of uranium and vanadium would have to obtain these commodities from some other source. Since the AEC-controlled lands contain higher grade ore than the average of U. S. reserves and are in an area of extensive mining over many years, it is reasonable to expect that the overall environmental impact of mining on these lands would be no greater, and could well be less than mining the same quantity of uranium and vanadium elsewhere.

Considering the substantial potential benefits versus the rather minimal adverse environmental effects and dollar costs, and in view of the lack of attractive alternatives and their environmental impact, it has been determined that the proposed leasing program should be undertaken.

IX. DISCUSSION OF COMMENTS RECEIVED ON THE DRAFT REPORT

Comments on the draft statement were received from seven Federal agencies, the States of Colorado and New Mexico, one university, and one private source. The letters of comment and AEC replies to them are included in Appendix F.

The most common concern expressed was with the ultimate disposition of tailings from uranium ore processing operations in view of their long-lived radioactivity. Consequently the section on ore processing has been expanded to indicate the control measures being undertaken. AEC is in full agreement with the EPA position that states having uranium milling operations should adopt control measures, such as Colorado has done, to assure that inactive tailings piles are adequately stabilized.

Two agencies, the Department of the Interior and the Environmental Protection Agency, felt that some expansion of the discussion of alternatives was desirable, and additional material has been provided to put the proposed leasing action into better perspective as a fuel source for power generation.

The subjects of surface management responsibility and the method of monitoring and enforcing environmental requirements in connection with exploration and mining activities have been clarified in view of comments from the Environmental Protection Agency.

Where appropriate the statement has been revised or expanded in response to specific comments.

Page

X. APPENDICES

APPENDIX A

LANDS HELD FOR URANIUM EXPLORATION AND MINING IN THE URAVAN MINERAL BELT

The following lands held by private enterprise for uranium mining and exploration in the Uravan Mineral Belt of Colorado were recognized, prior to January 1, 1966, by the AEC under the uranium allocation program established pursuant to the AEC announcement of November 24, 1958.

Mining Claims	190,000 acres
Fee land	12,700 acres
State land	8,000 acres
	210,700

Since January 1, 1966 additional lands have been acquired by new claim locations in the areas indicated below:

COUNTY	NUMBER OF CLAIMS	ACRES
Delta	202	3,030
Montrose	7,160	107,400
San Miguel	9,909	148,635
Montezuma	1,326	19,890
Dolores	4,082	61,130
Mesa	1,721	25,815
	24,400	365,900

This acreage for claims staked subsequent to January 1, 1966 was derived by using 15 acres per claim instead of 20.66 to allow for overlapping and fractional claims.

In addition, 50,000 acres of fee land have been leased since January 1, 1966 for uranium exploration and production in the Uravan Mineral Belt.

Thus, the total acreage held for uranium exploration and mining in the Uravan Mineral Belt in Colorado on October 15, 1971 is:

210,700
365,900
50,000
626,600

AEC holds 24,600 acres of mineral lands in Colorado, New Mexico and Utah. 21,400 acres are in the Uravan Mineral Belt and amount to 3.3% of the total lands held.

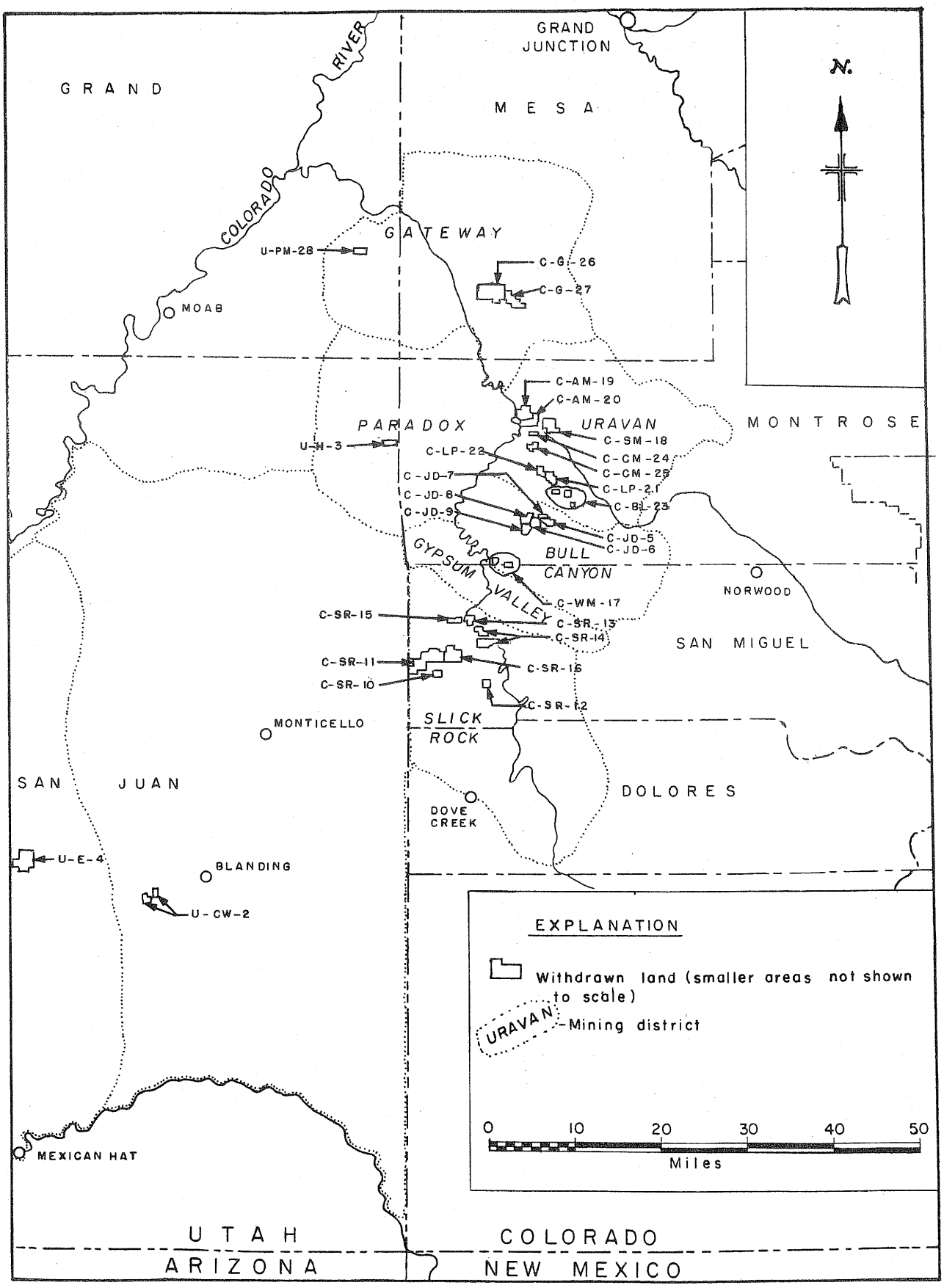
APPENDIX B

MAPS AND AERIAL PHOTOGRAPHS OF LEASE BLOCKS

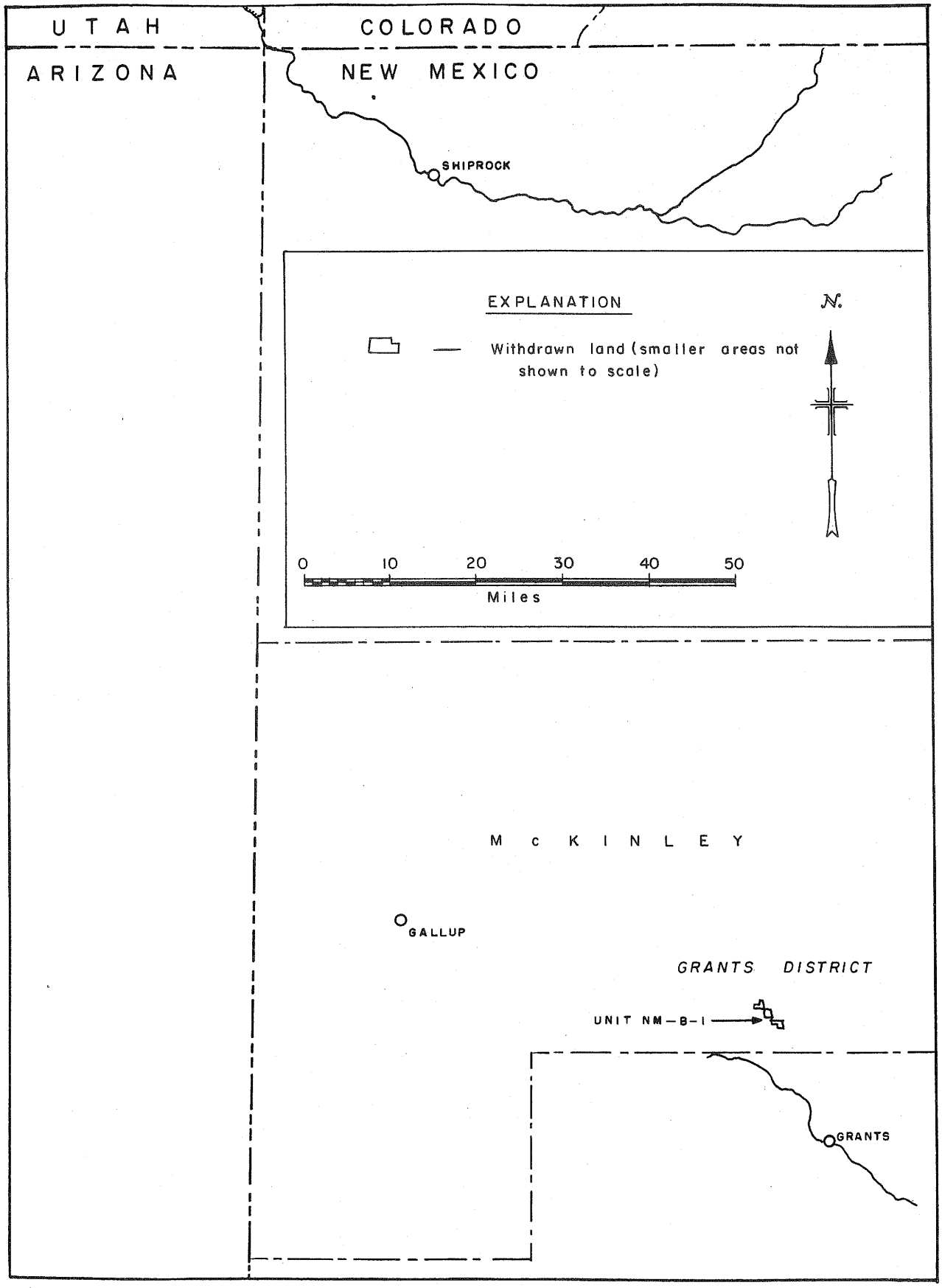
The maps in this Appendix "B" indicate the location of each of the tracts that are leasable by the AEC pursuant to Domestic Uranium Program Circular 8.

Each of the unit maps is identified by a number with prefixes indicating the state and locality of the unit; i.e., Unit C-AM-19 indicates that the tract is in Colorado, in the Atkinson Mesa locality, and is tract or unit number 19. A number of the units with same prefix are adjacent to each other. The shaded area of each unit indicates the configuration and relative size of the area that is leasable. The cross-hatched areas on some maps indicate portions of lease blocks that will be excluded from the lands offered for lease for environmental or other reasons. These areas do not have known reserves, and are not considered favorable for exploration.

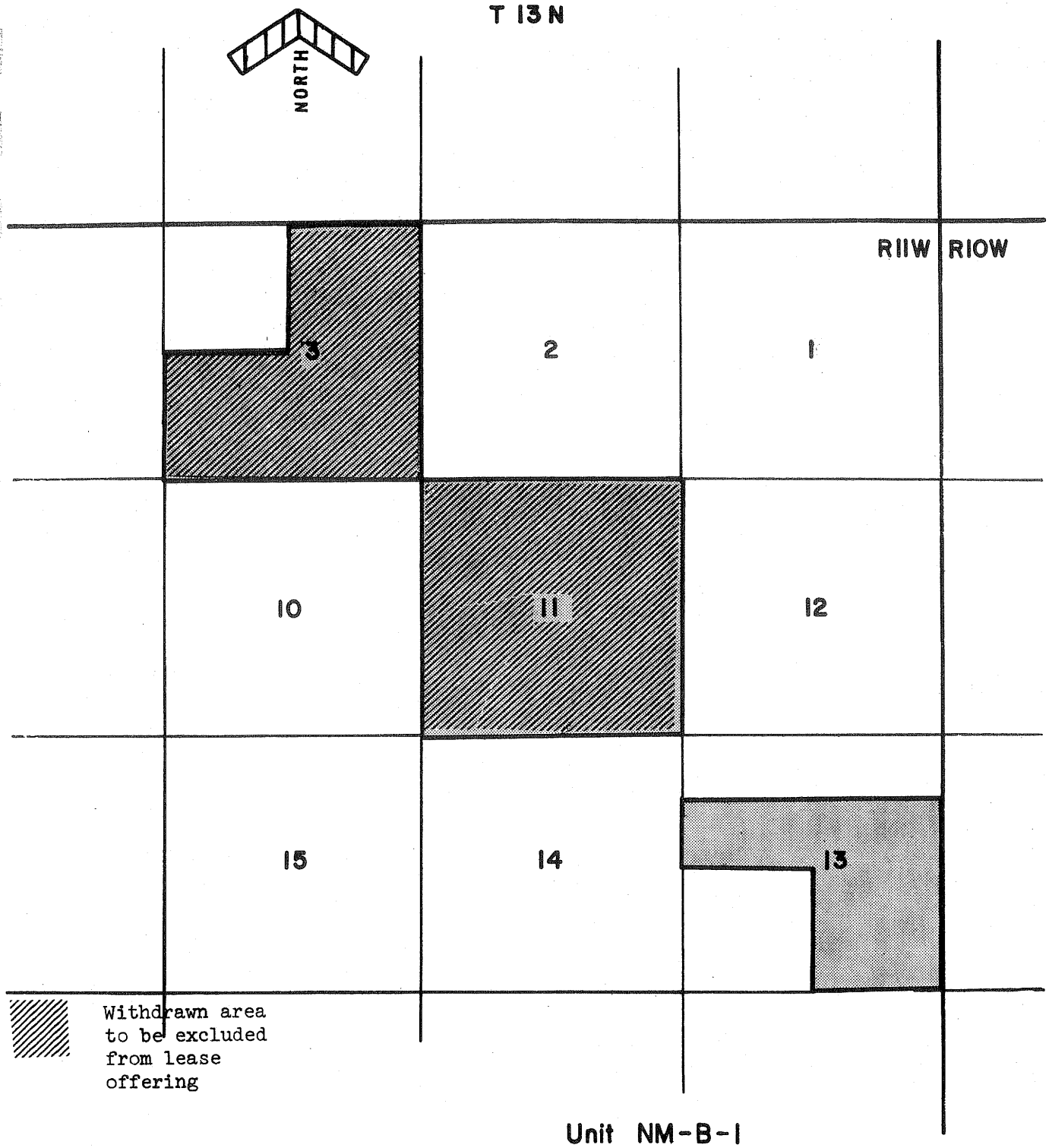
The known privately located claims adjacent to or within the withdrawn blocks are indicated by unshaded areas. Aerial photographs of five of the units are included.



Index Map of Proposed Mineral Lease Units
Sheet I -65-



Index Map of Proposed Mineral Lease Units
Sheet 2

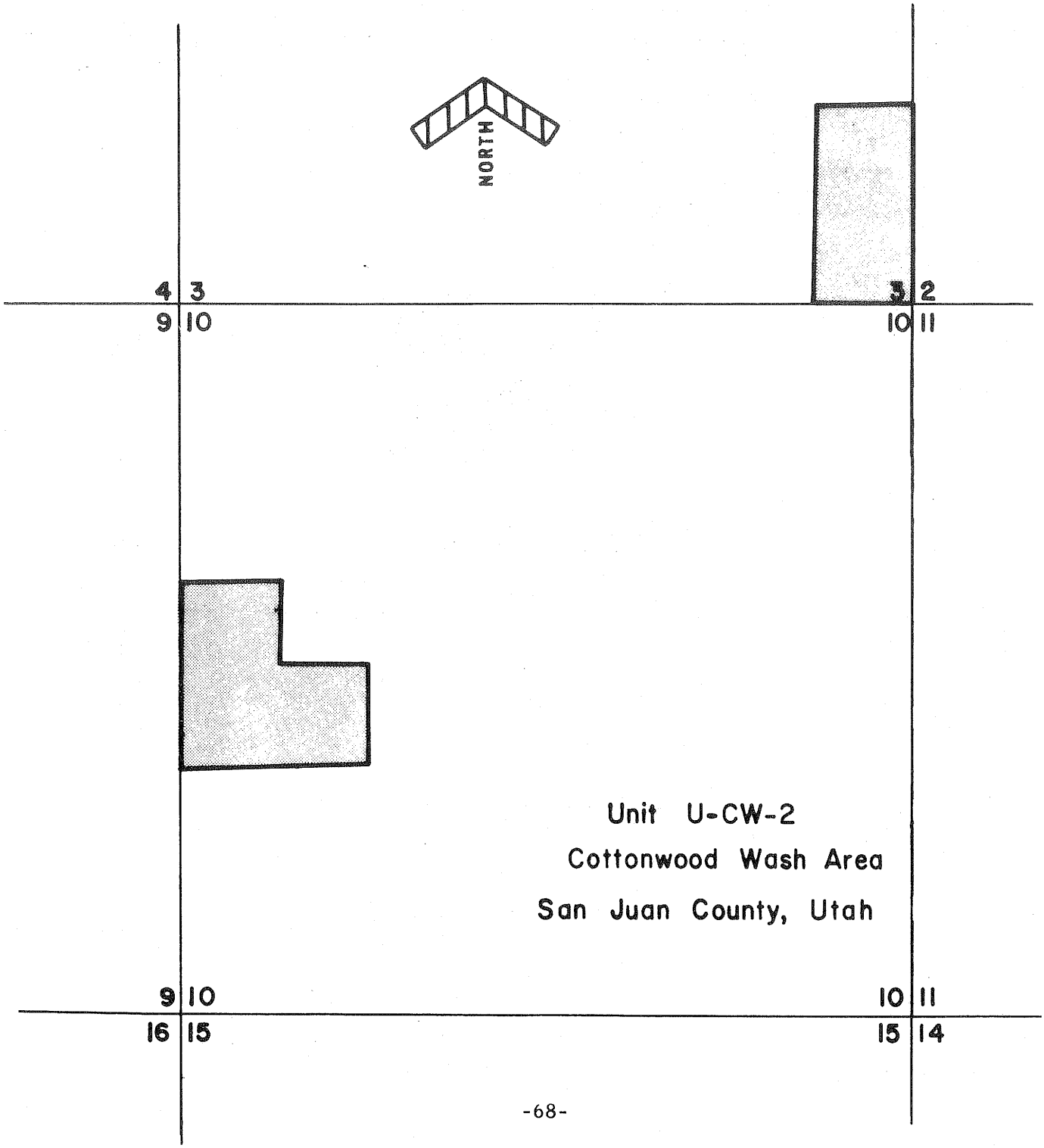


Unit NM-B-1

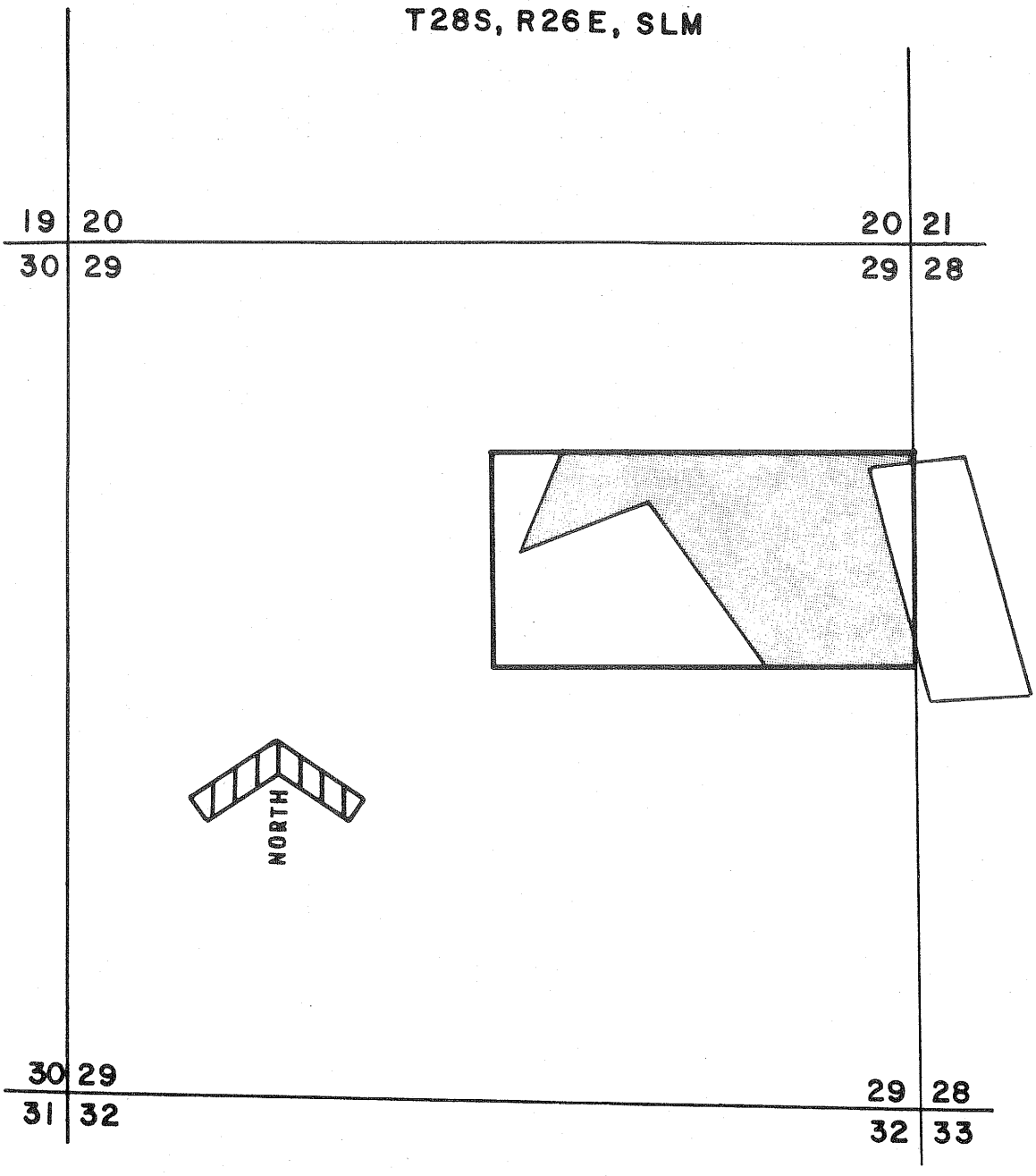
Haystack Butte Area

McKinley County, New Mexico

T37S, R21E



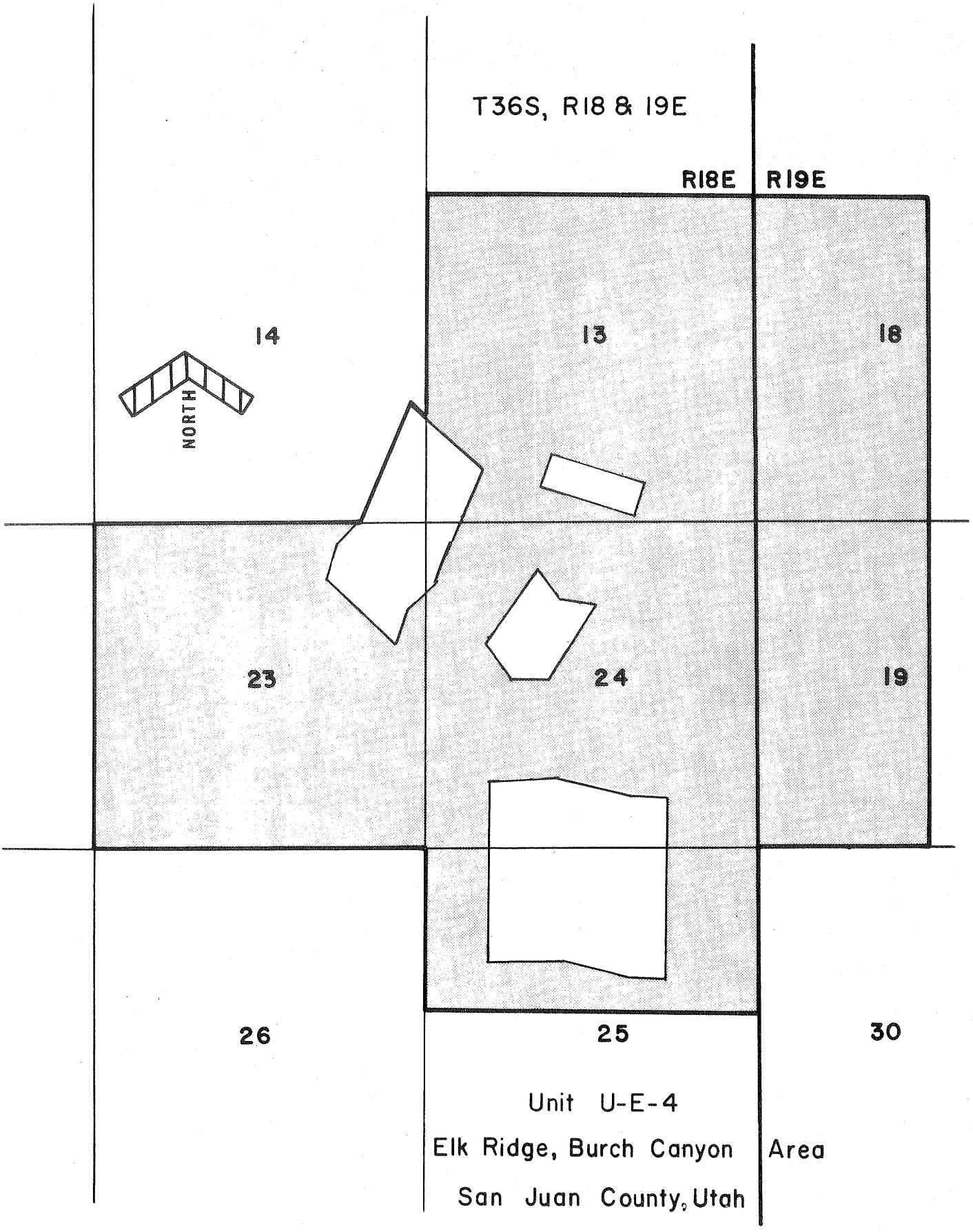
Unit U-CW-2
Cottonwood Wash Area
San Juan County, Utah



Unit U-H-3

Hideout Mesa

San Juan County, Utah

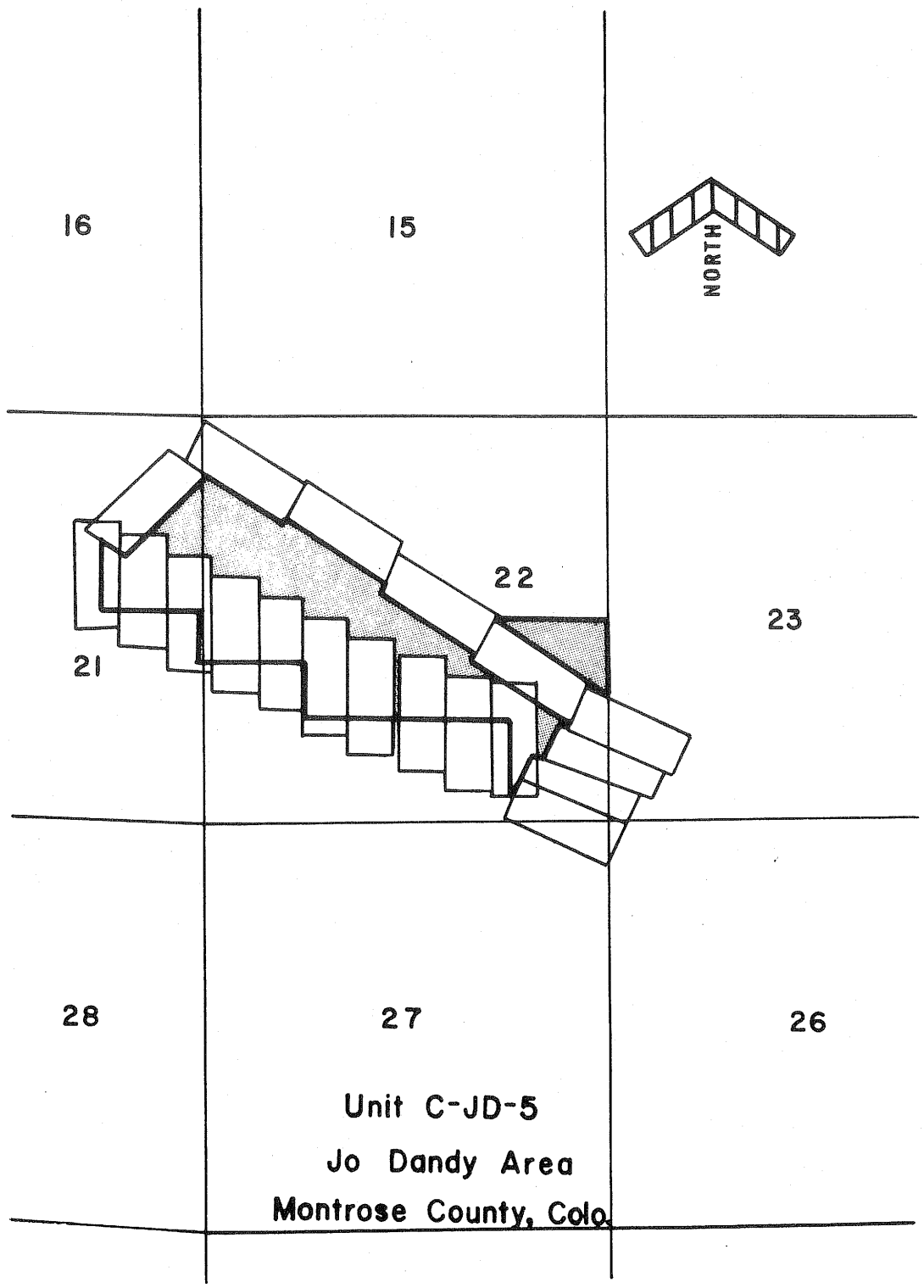


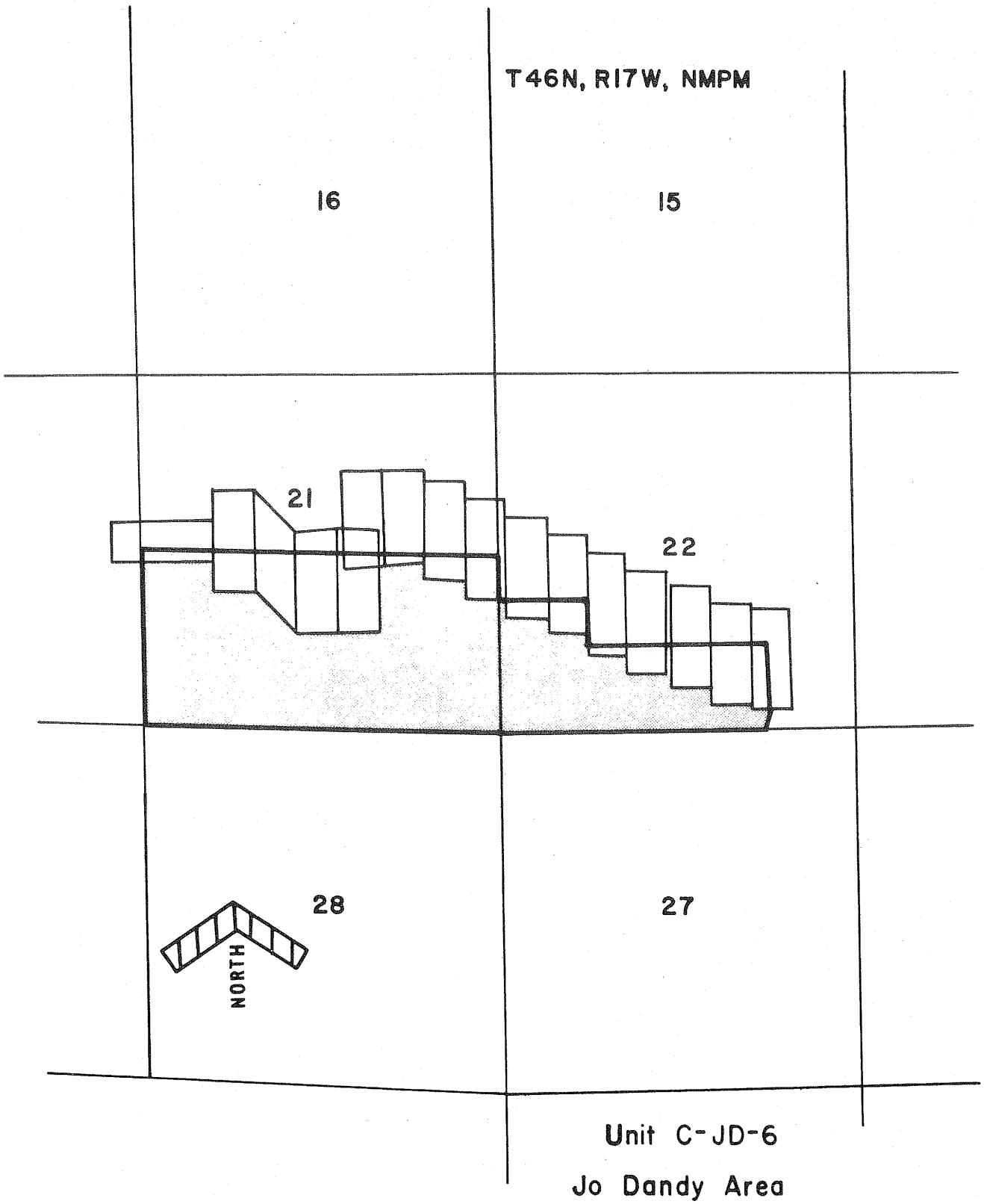
Unit U-E-4

Elk Ridge, Burch Canyon Area

San Juan County, Utah

T46N, R17W, NMPM

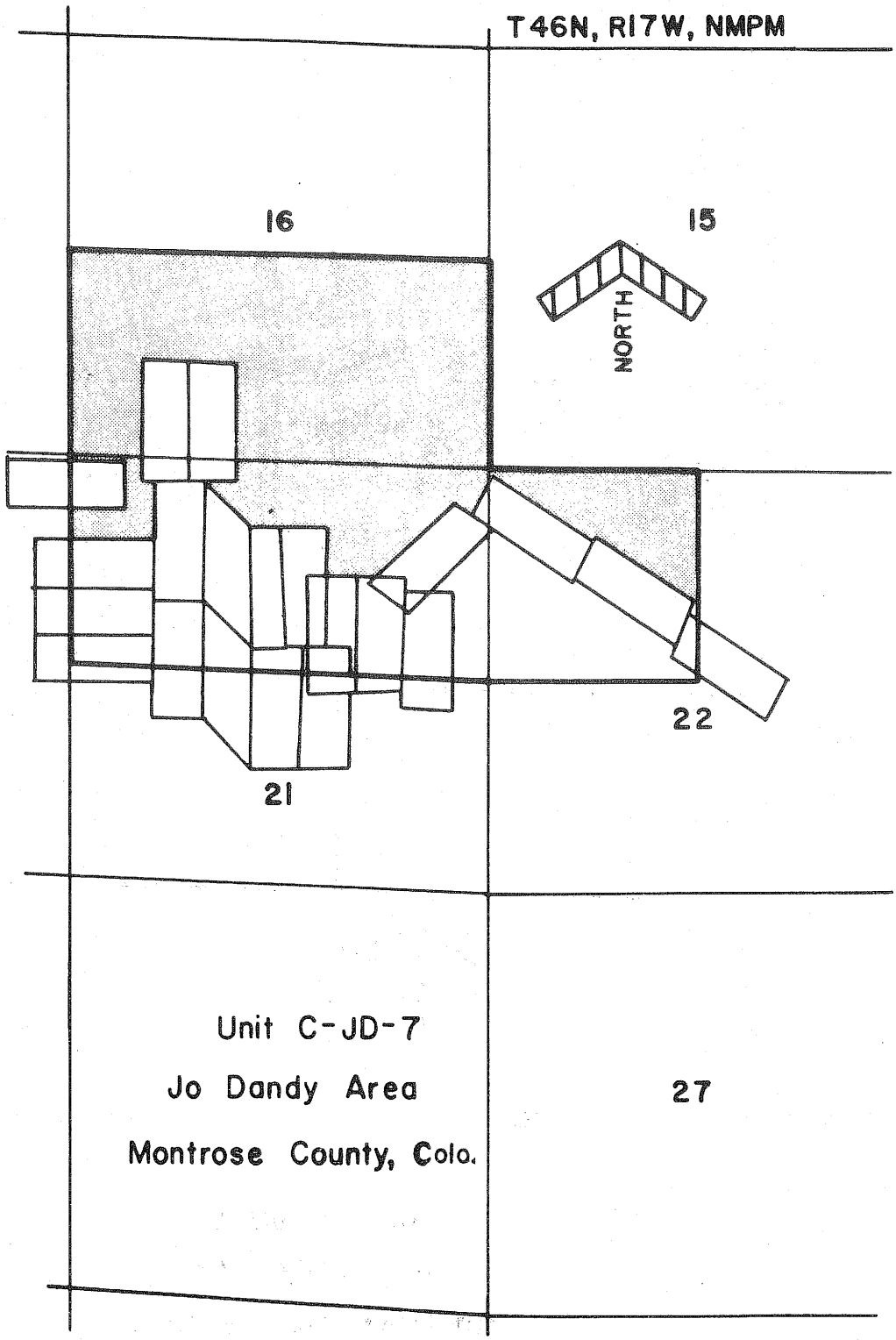




Unit C-JD-6

Jo Dandy Area

Montrose County, Colo.


T46N, R17W, NMPM
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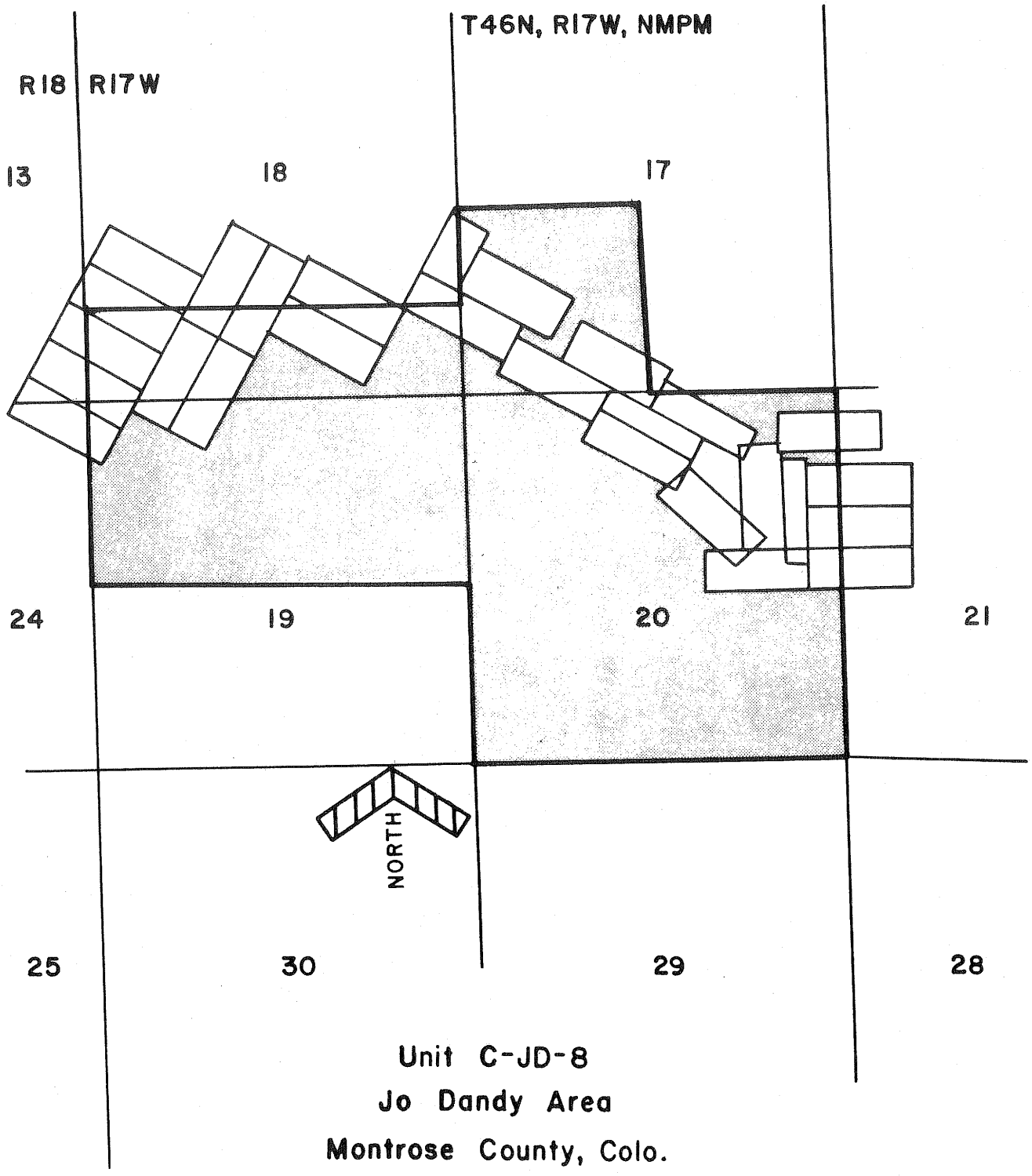
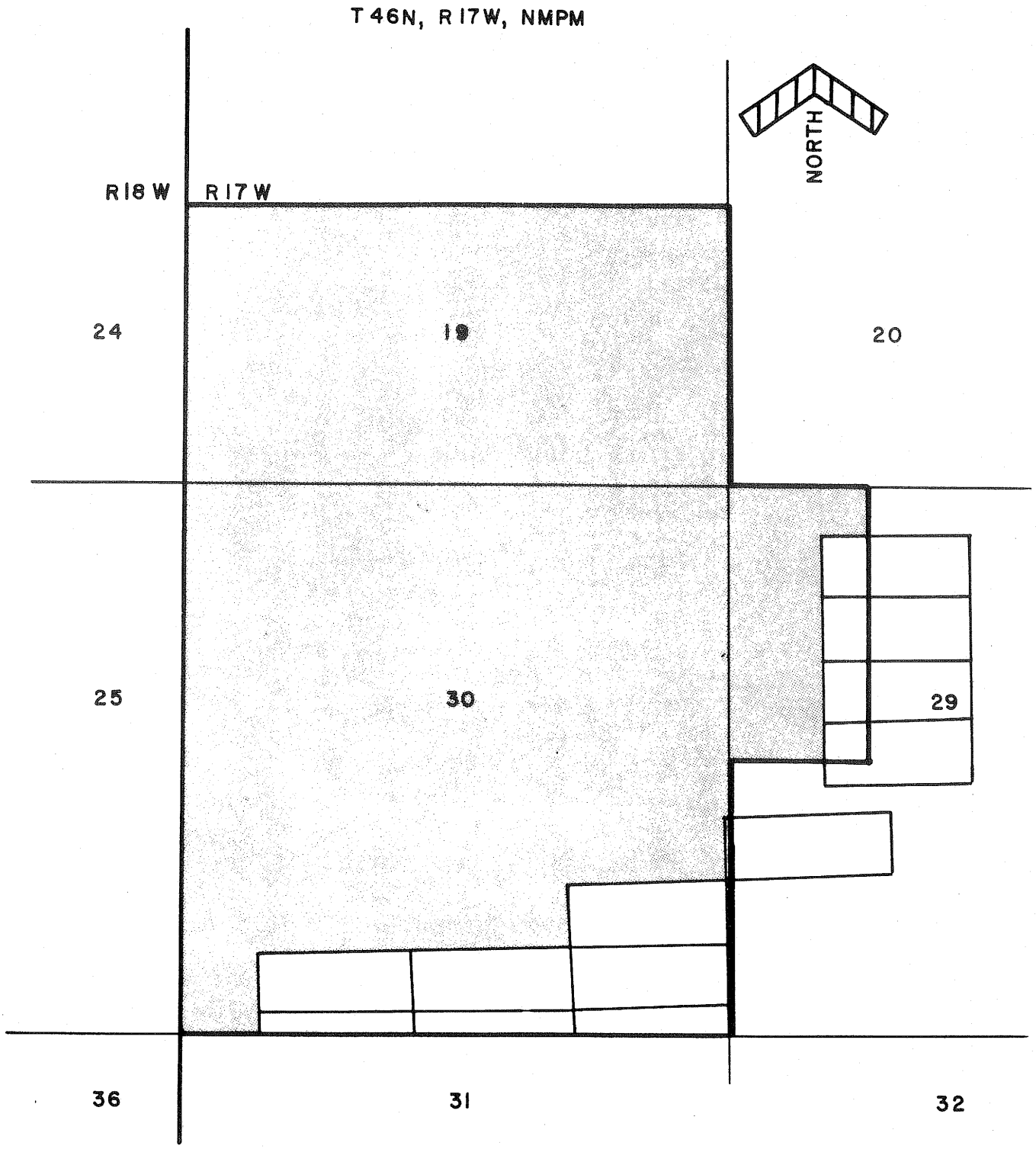
NORTH
22
21
Unit C-JD-7
Jo Dandy Area
Montrose County, Colo.
27



Unit C-JD-8
Jo Dandy Area
Montrose County, Colo.

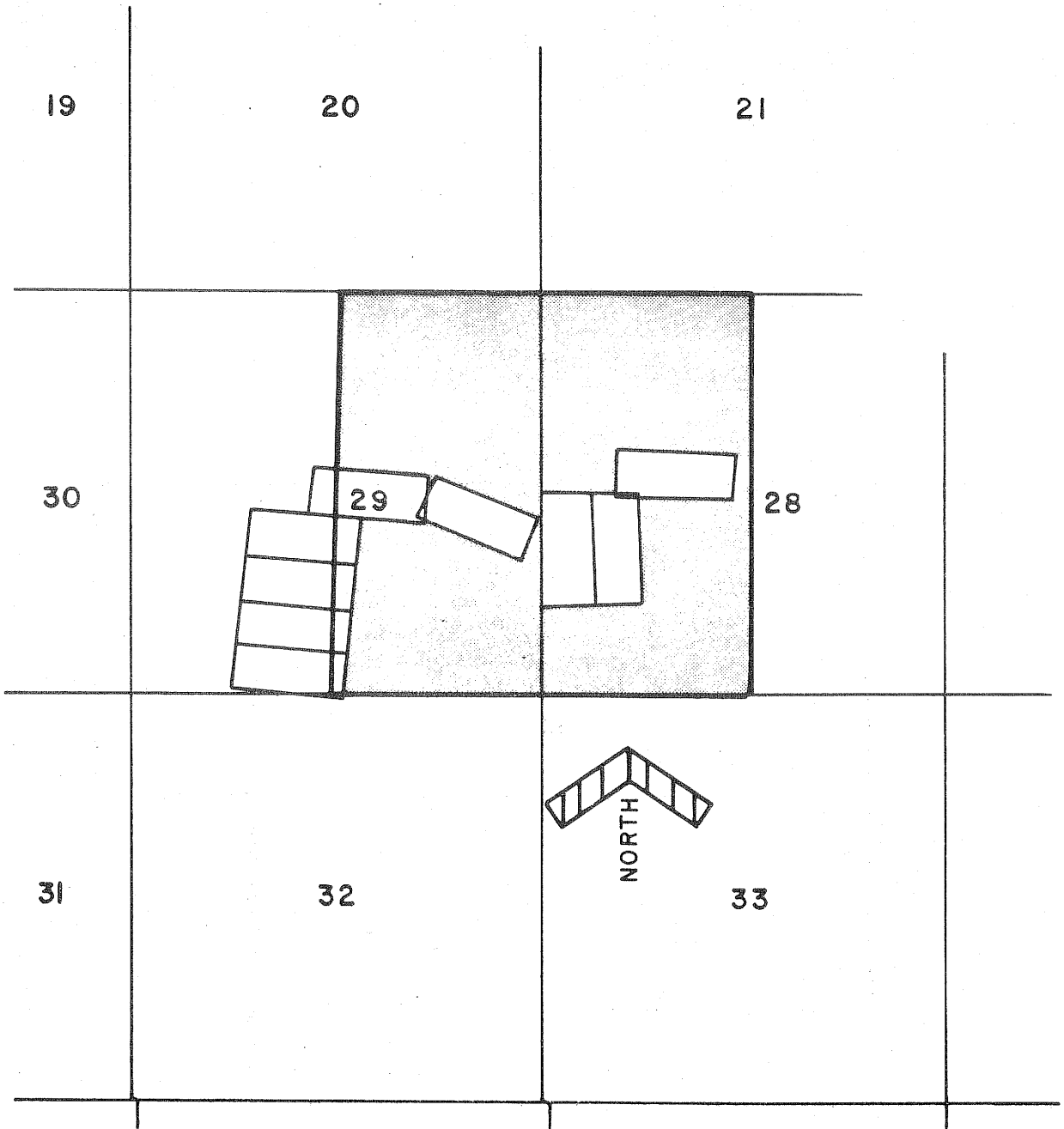


Unit C-JD-9

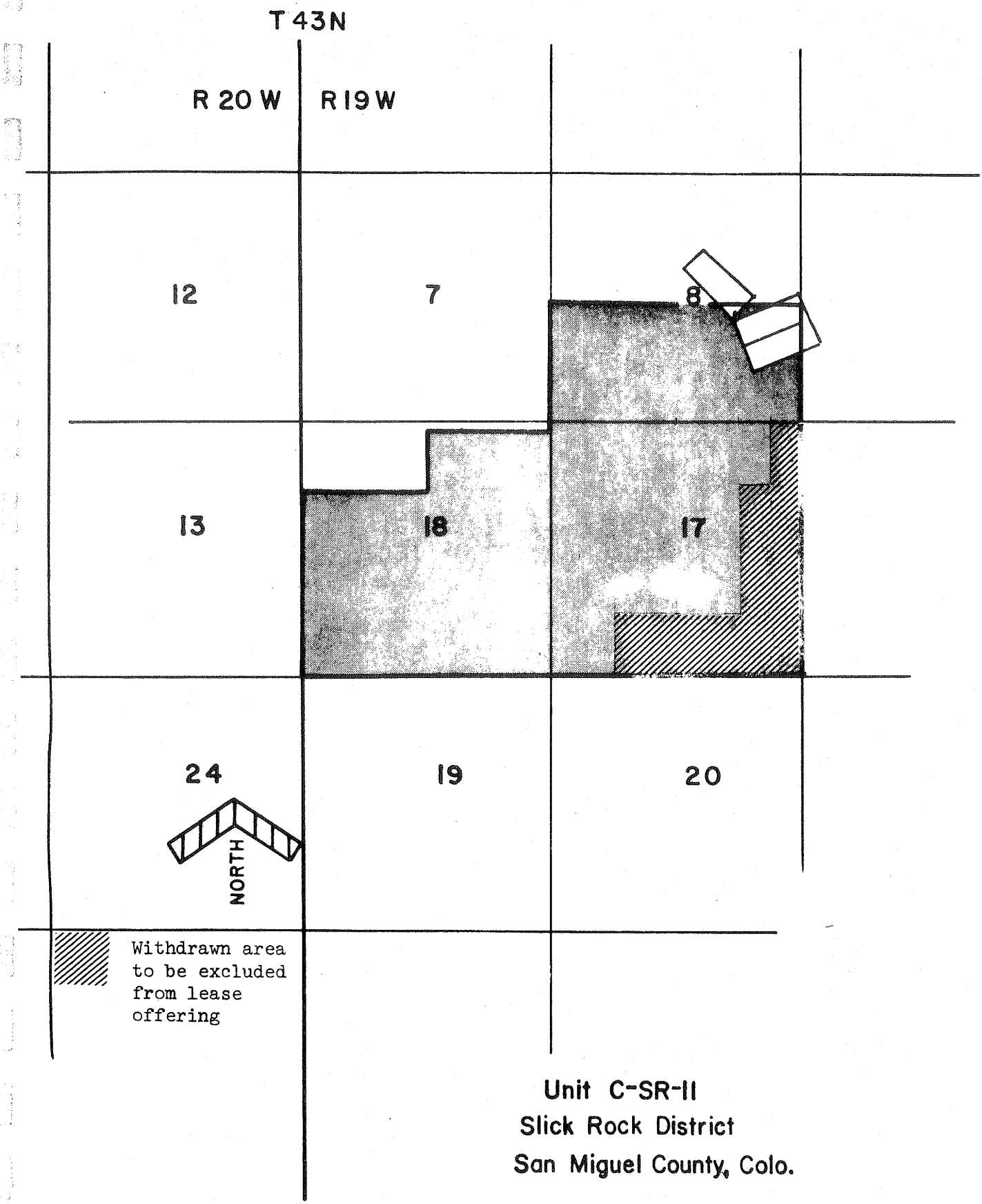
Monogram Mesa

Montrose County, Colo.

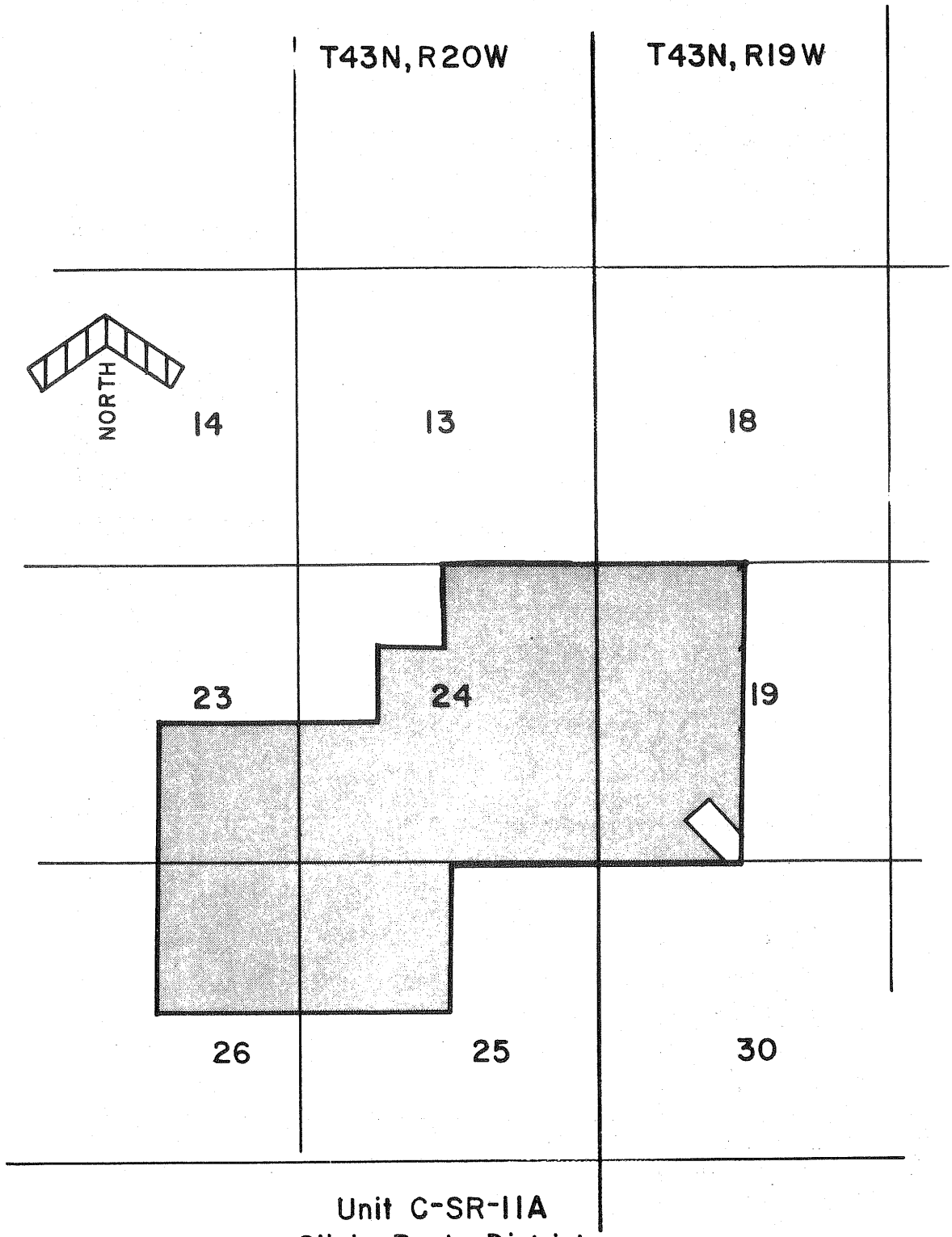
T 43N, R 19 W, NMPM



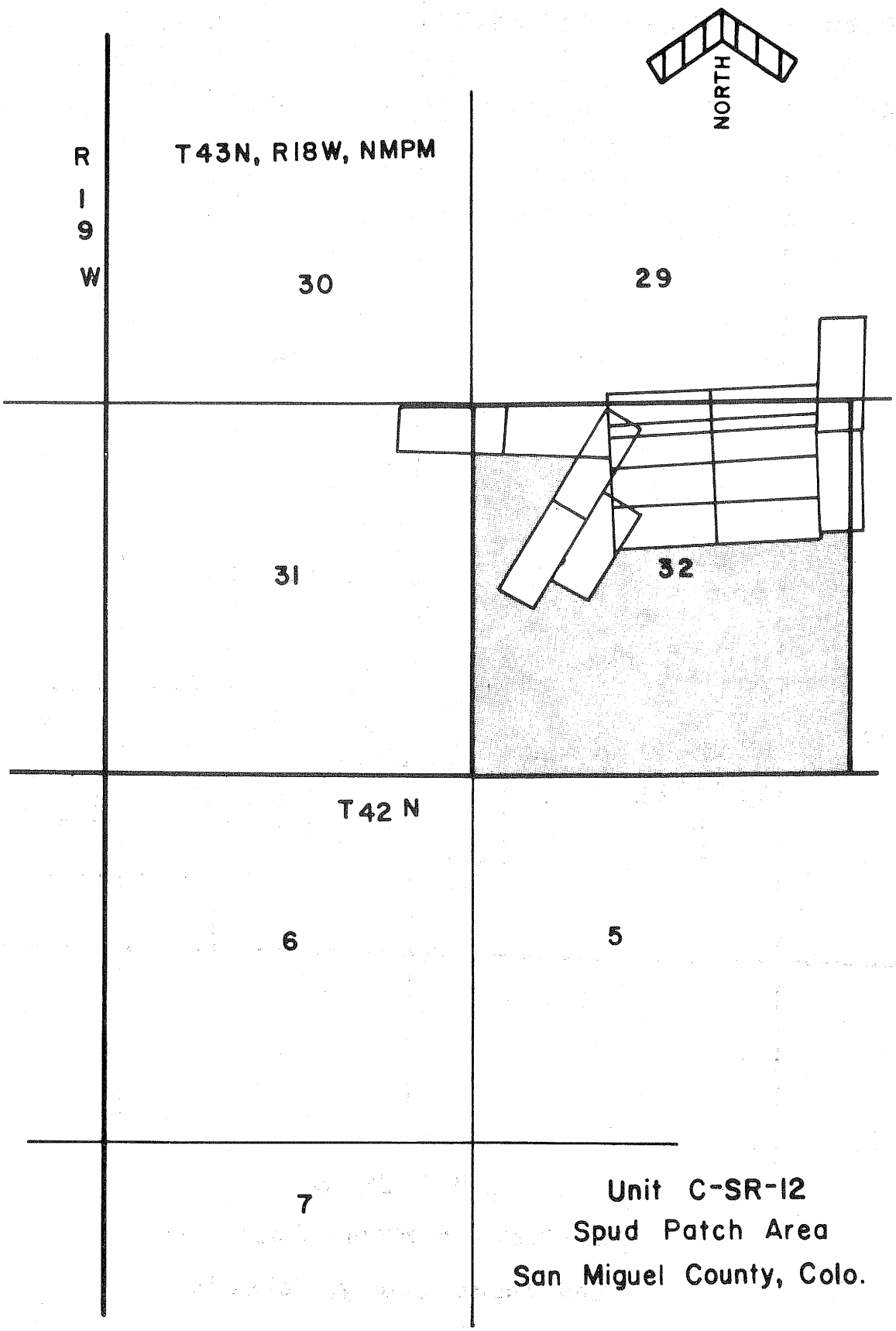
Unit C-SR-10
Slick Rock District
San Miguel County, Colo.



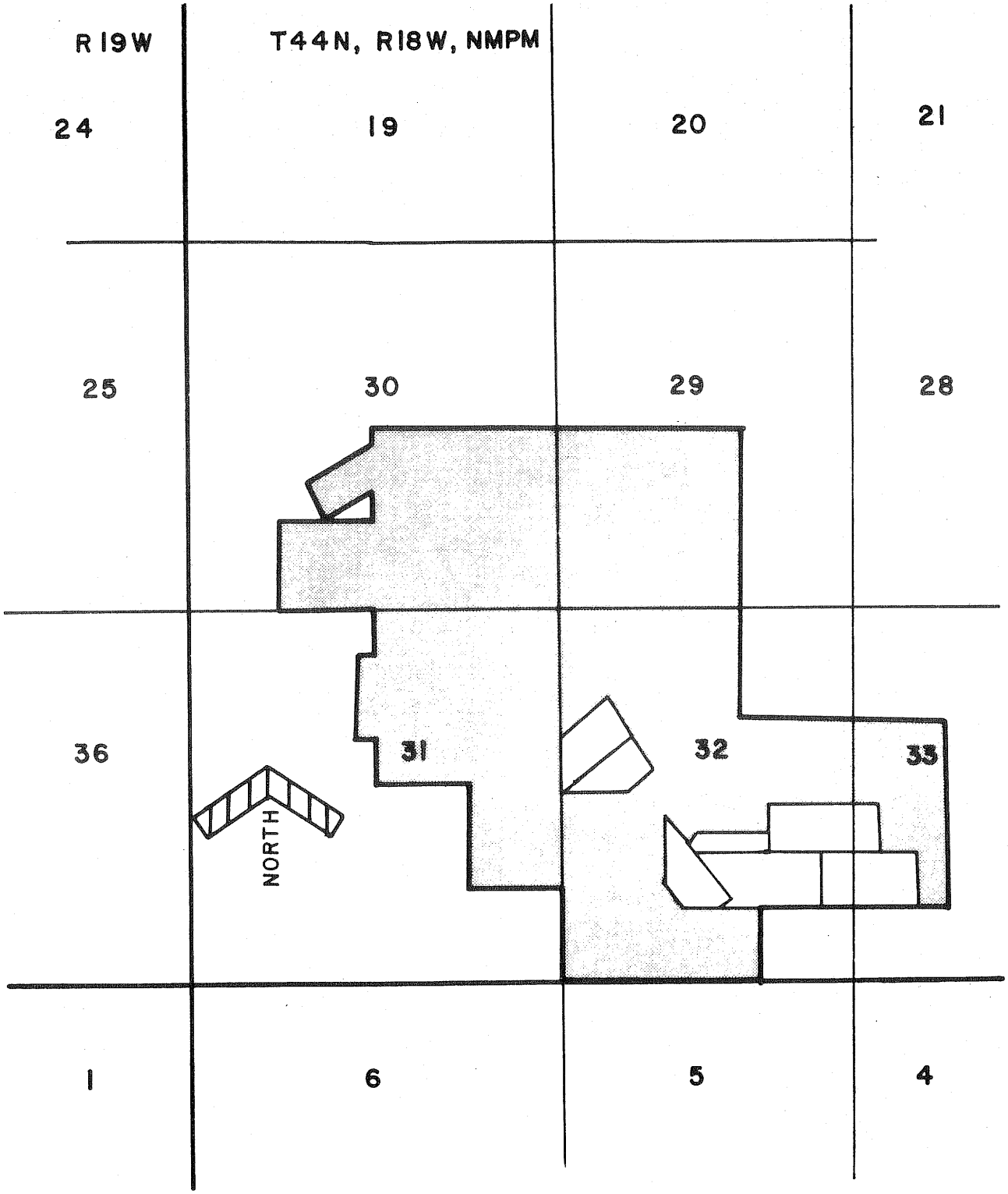
Unit C-SR-11
Slick Rock District
San Miguel County, Colo.



Unit C-SR-11A
Slick Rock District
San Miguel County, Colo.



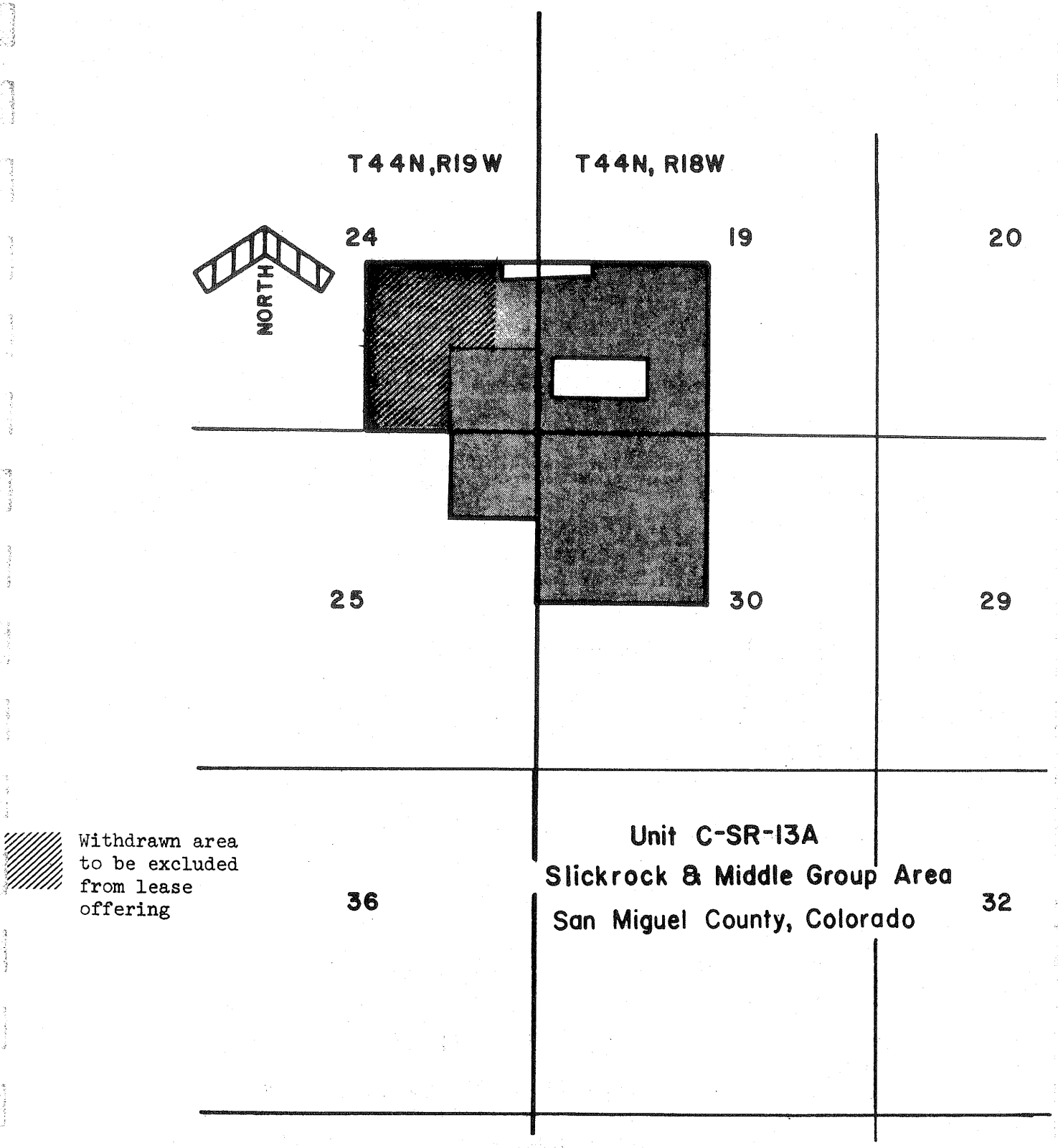
Unit C-SR-12
Spud Patch Area
San Miguel County, Colo.



Unit C-SR-13

Slickrock & Middle Group Area

San Miguel County, Colorado


T44N,R19W
T44N, R18W
NORTH
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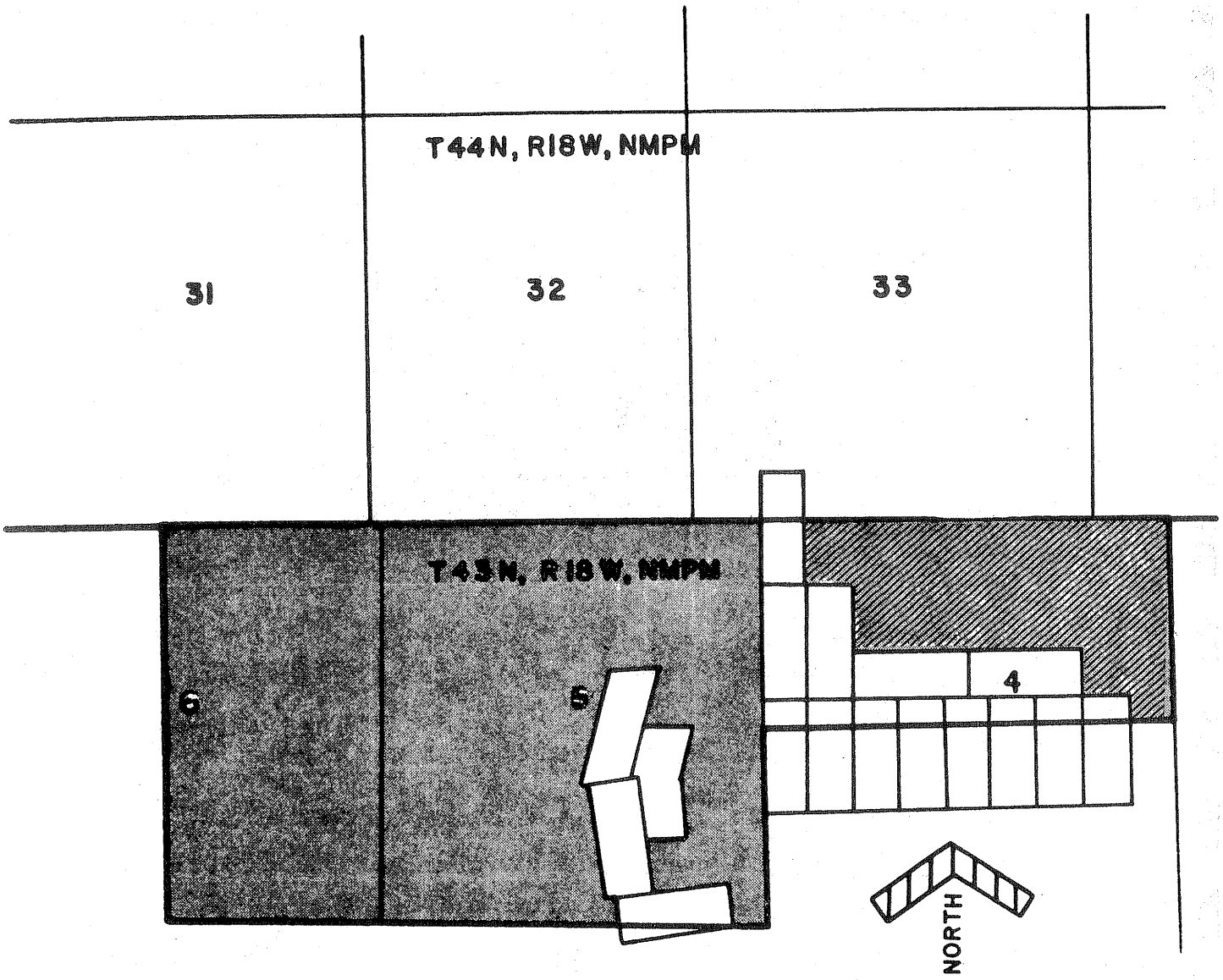
32
Withdrawn area to be excluded from lease offering
Unit C-SR-13A
Slickrock & Middle Group Area
San Miguel County, Colorado

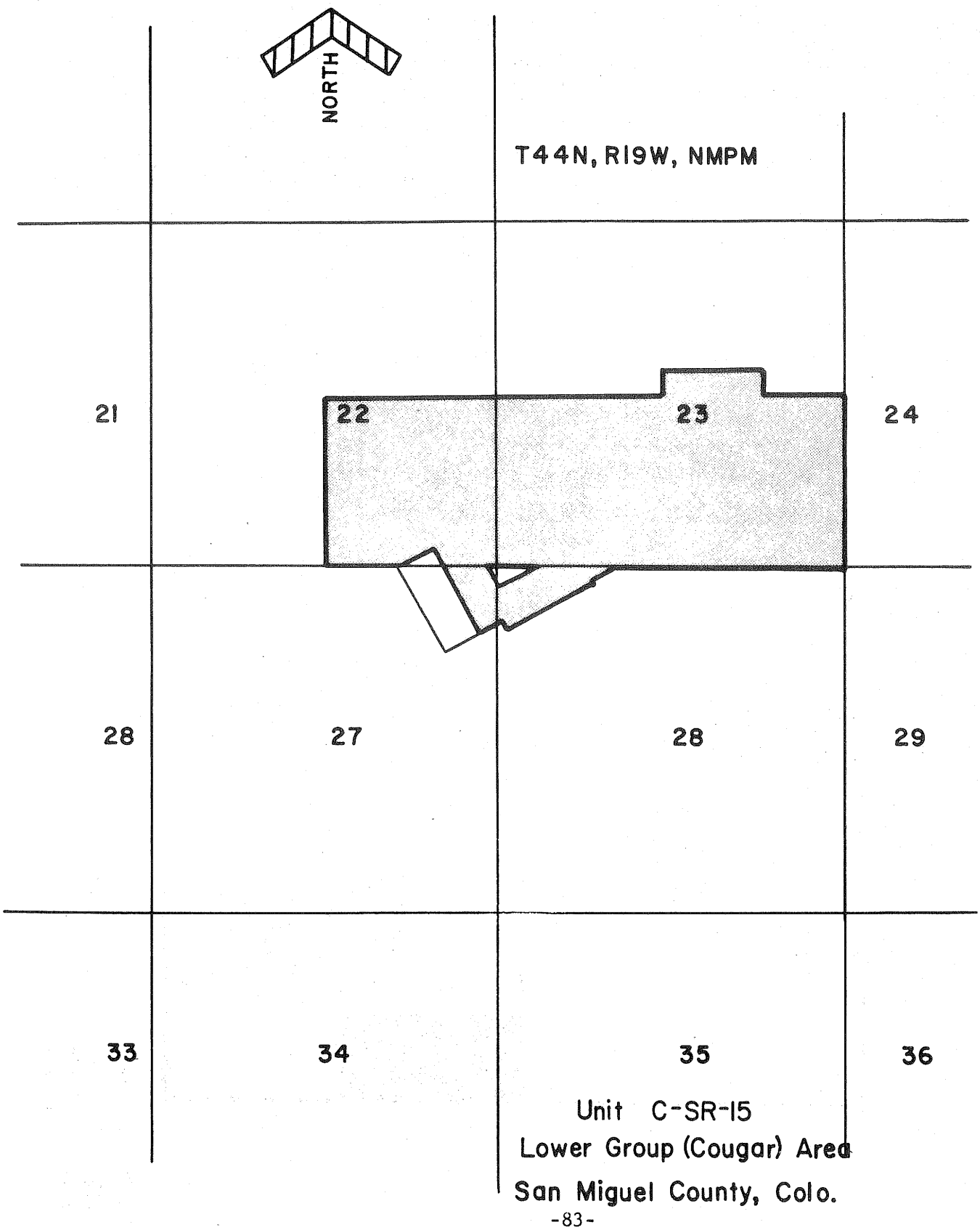


Unit C-SR-14

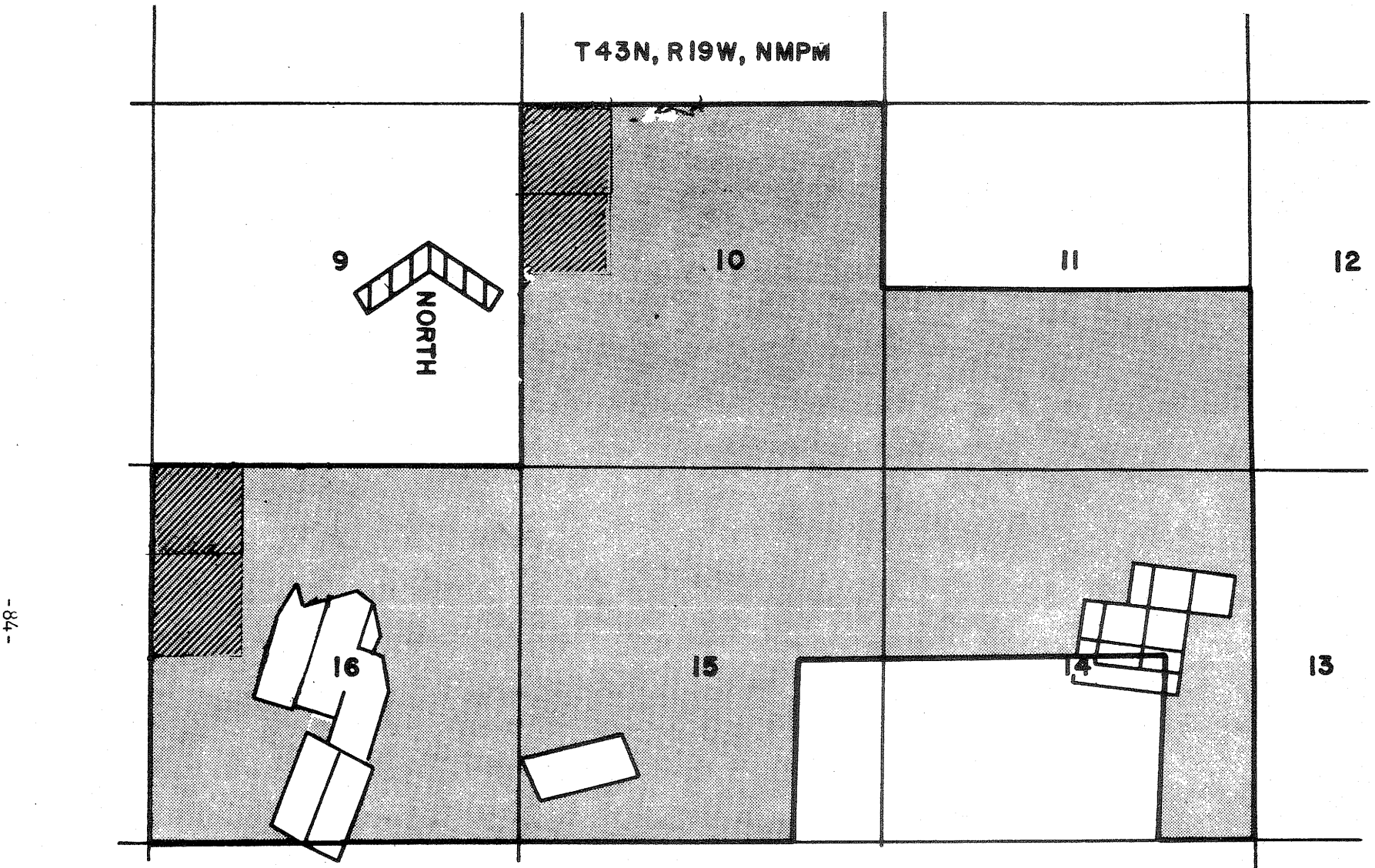
Middle & Upper Group Area

San Miguel County, Colorado

Withdrawn area to be excluded from lease offering

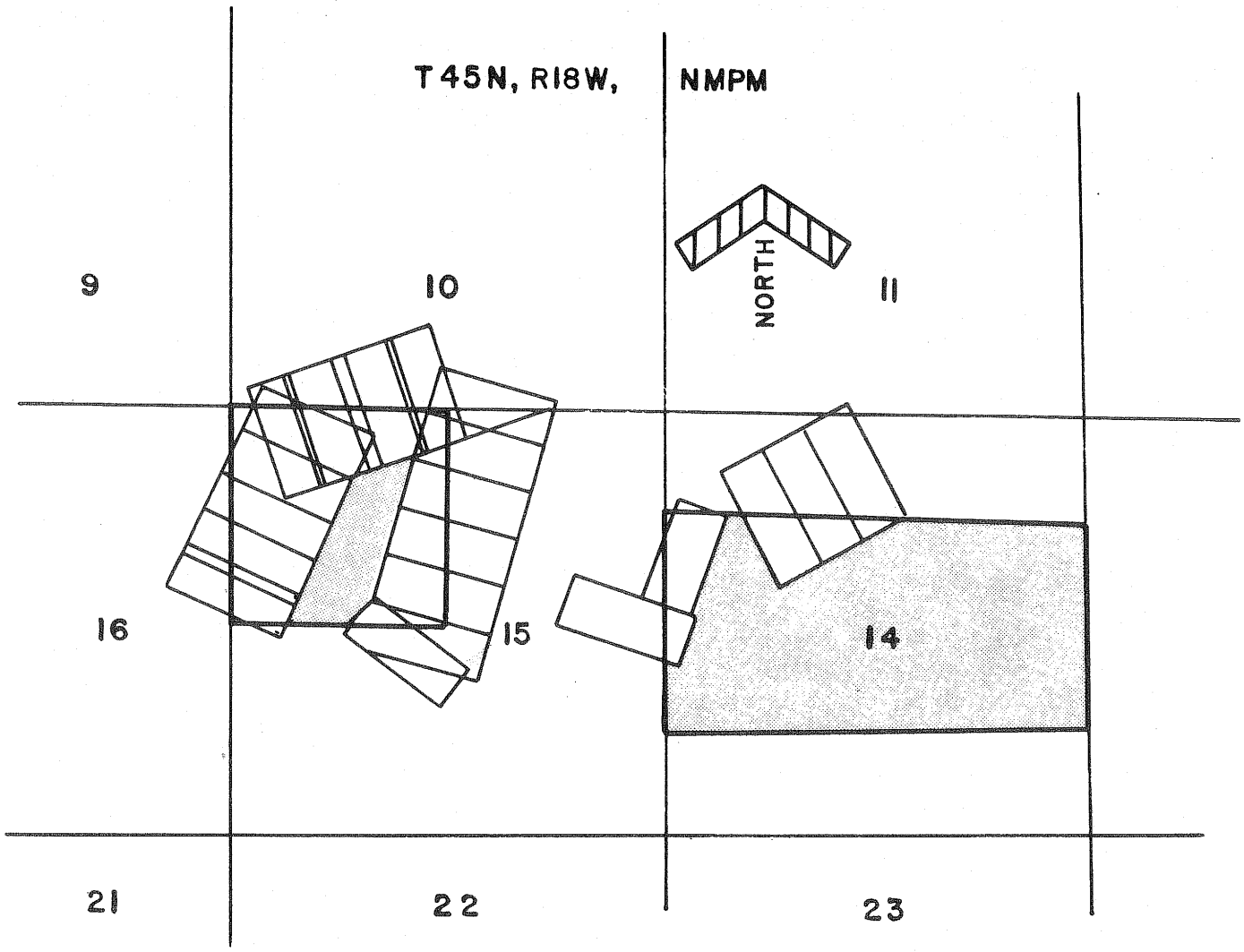


Unit C-SR-15
Lower Group (Cougar) Area
San Miguel County, Colo.

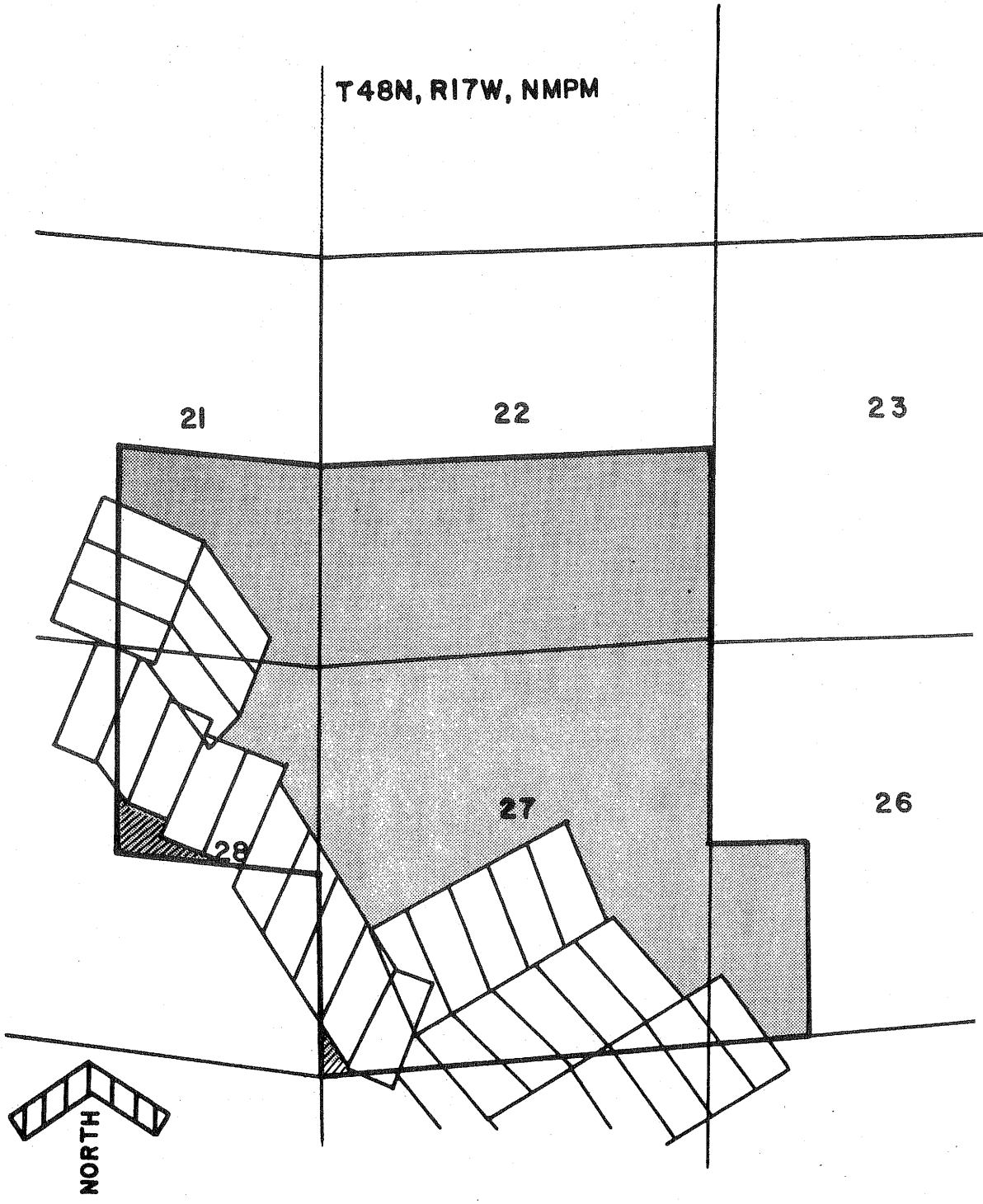


Withdrawn area to be excluded from lease offering

Unit C-SR-16
Slick Rock District
San Miguel County, Colo.

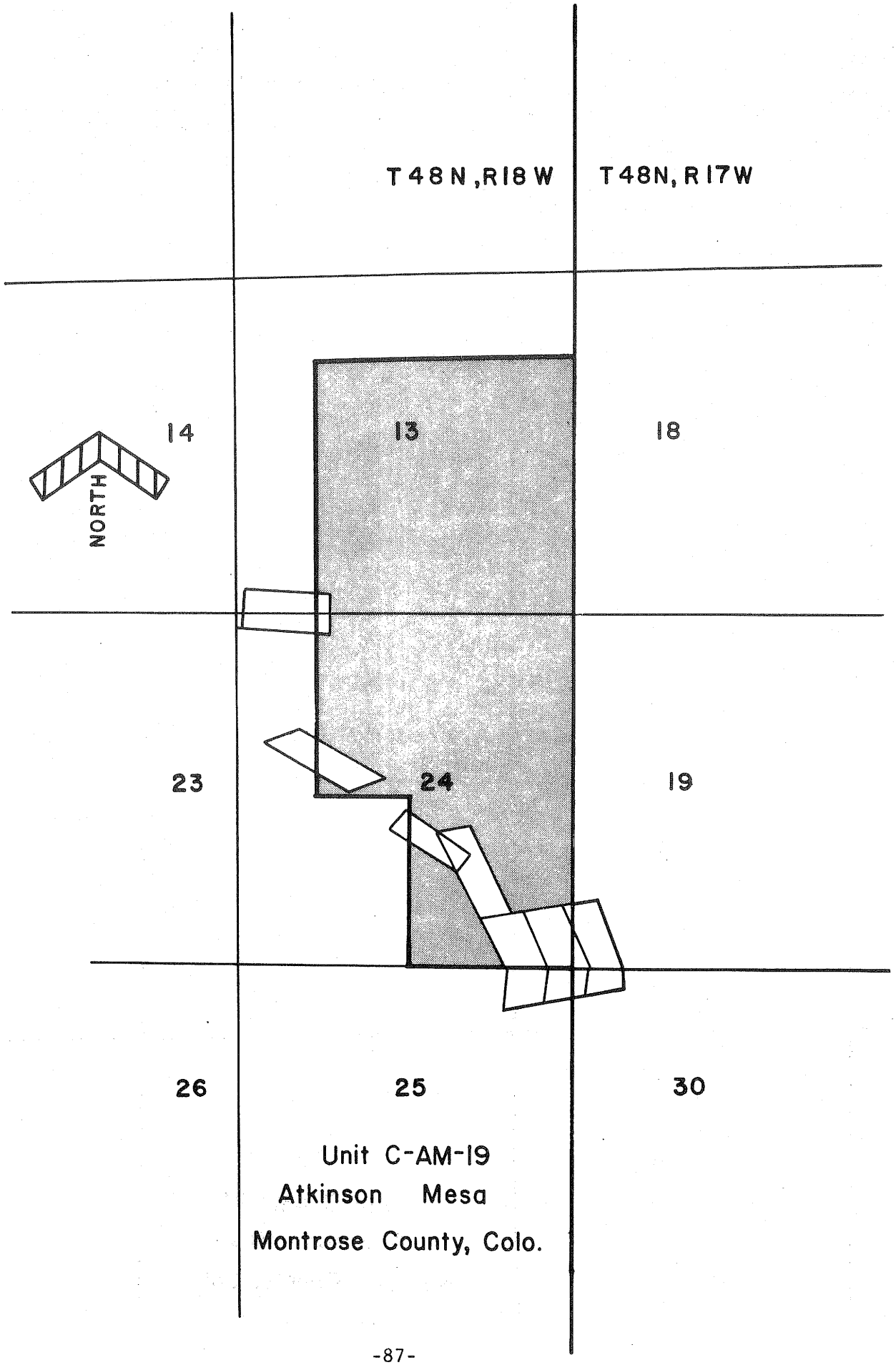


Unit C-WM-17
Wedding Bell Mountain Area
Montrose & San Miguel Counties, Colo.



Withdrawn area to be excluded from lease offering

Unit C-SM-18
Spring Creek Mesa
Montrose County, Colo.



Unit C-AM-19
Atkinson Mesa
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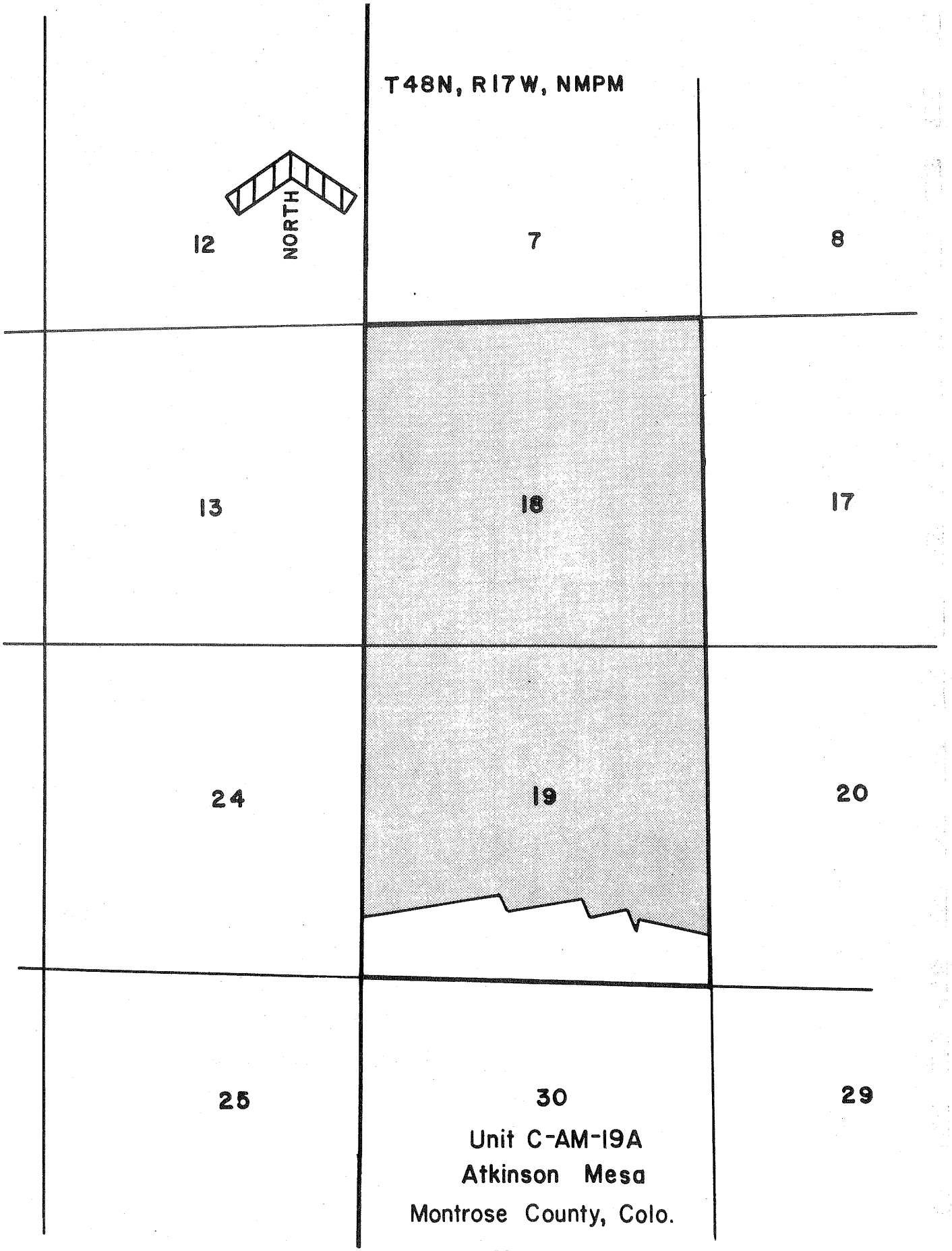

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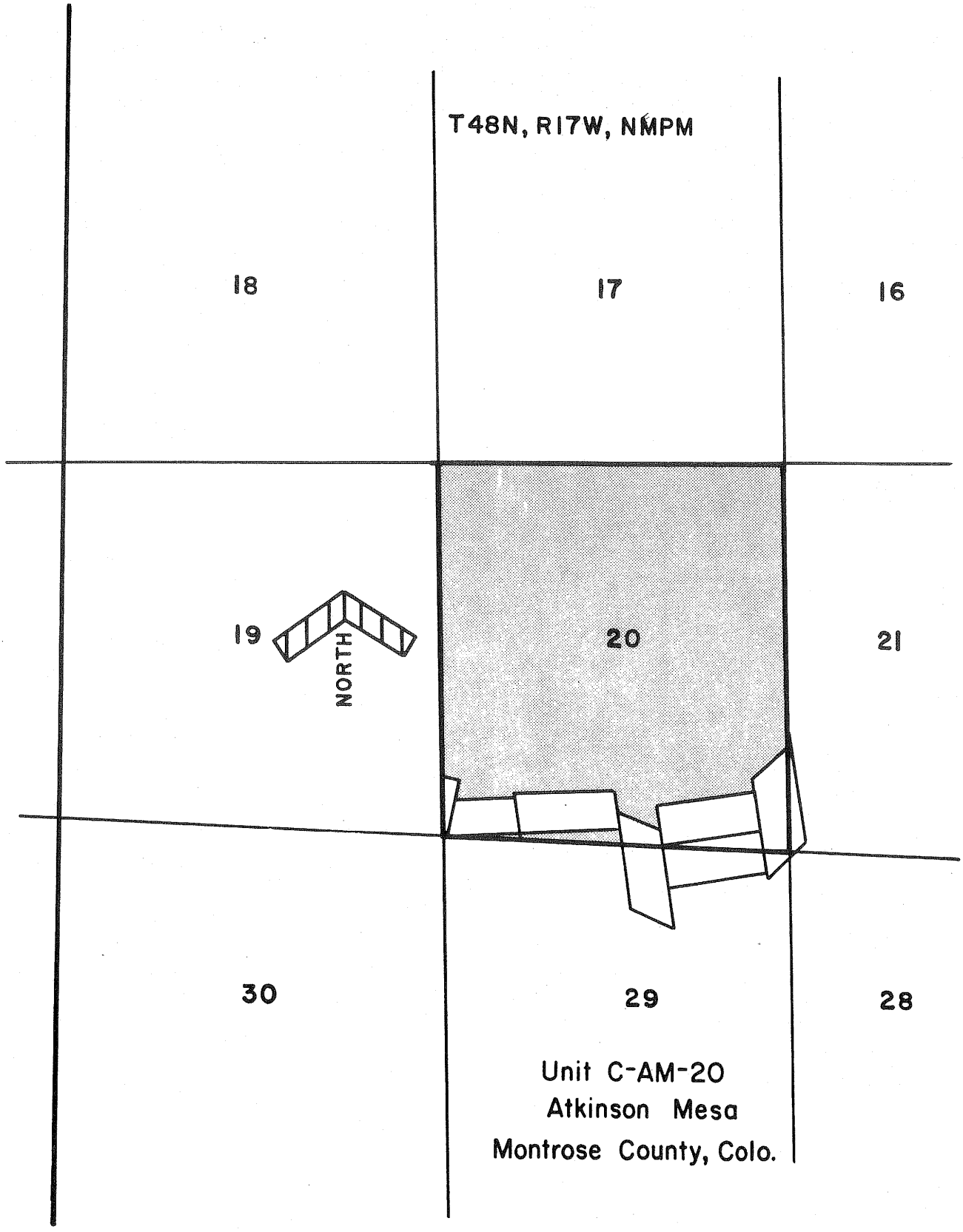
T48N, R17W, NMPM
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NORTH
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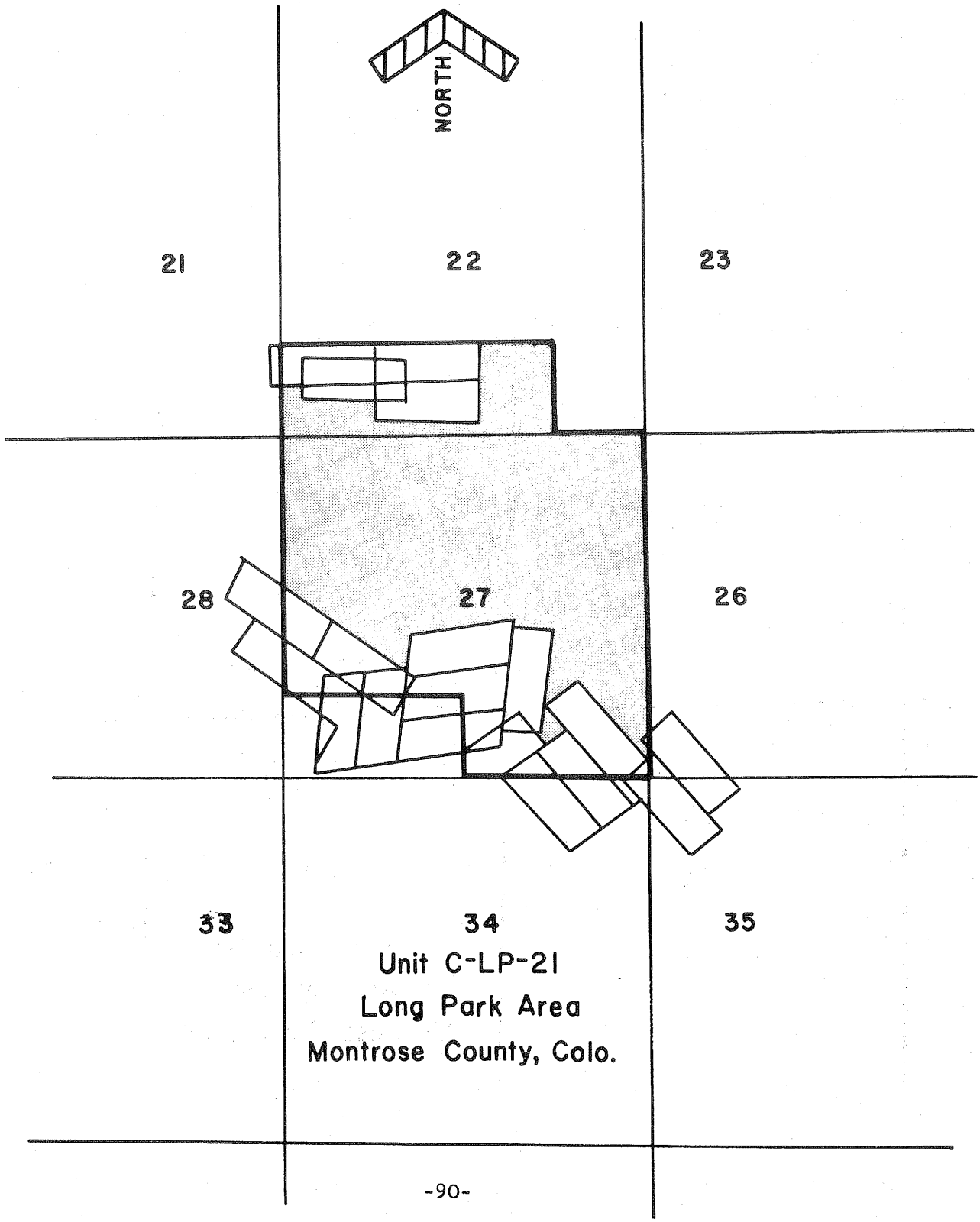
Unit C-AM-20
Atkinson Mesa
Montrose County, Colo.

T47N, R17W, NMPM



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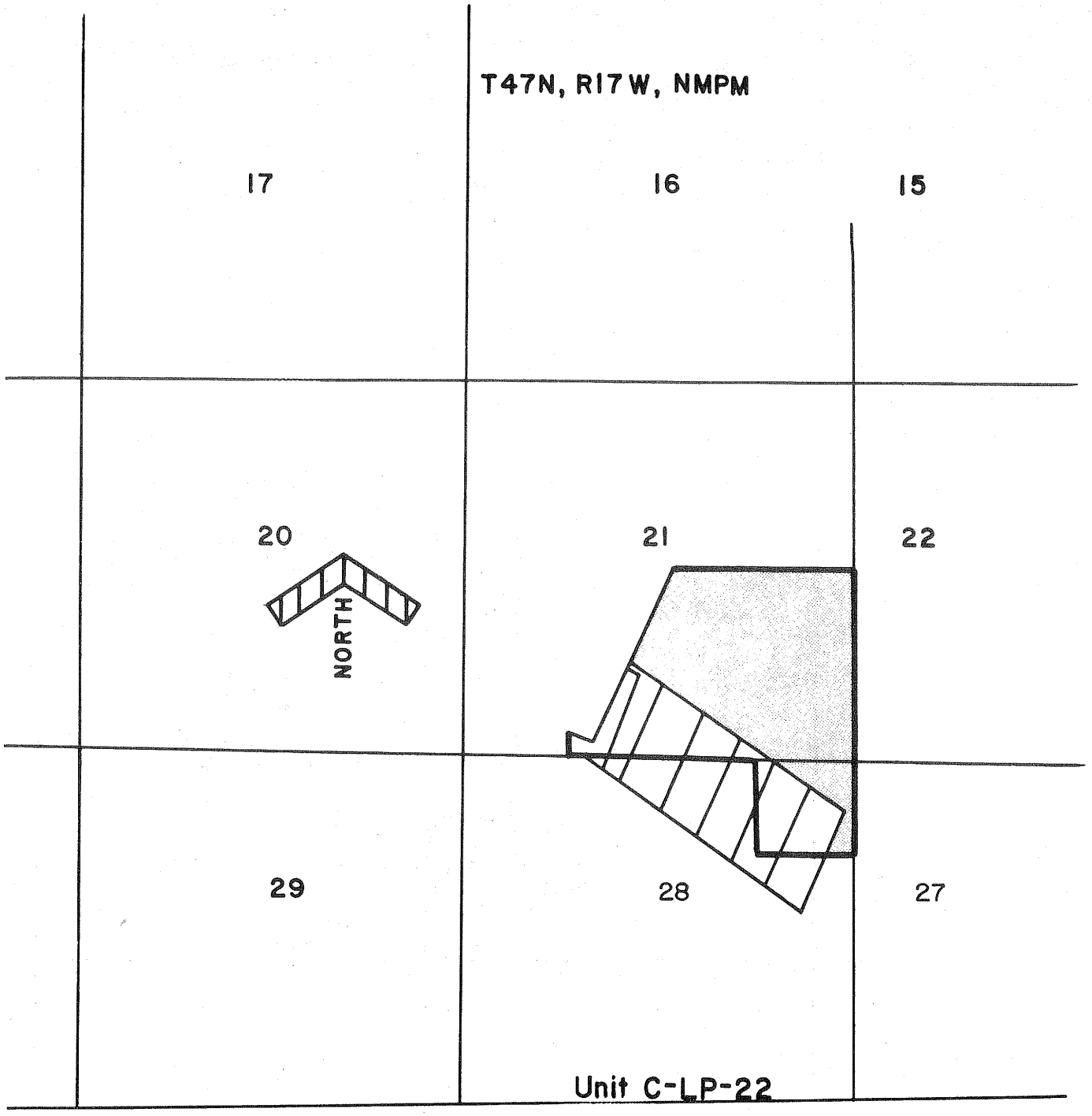
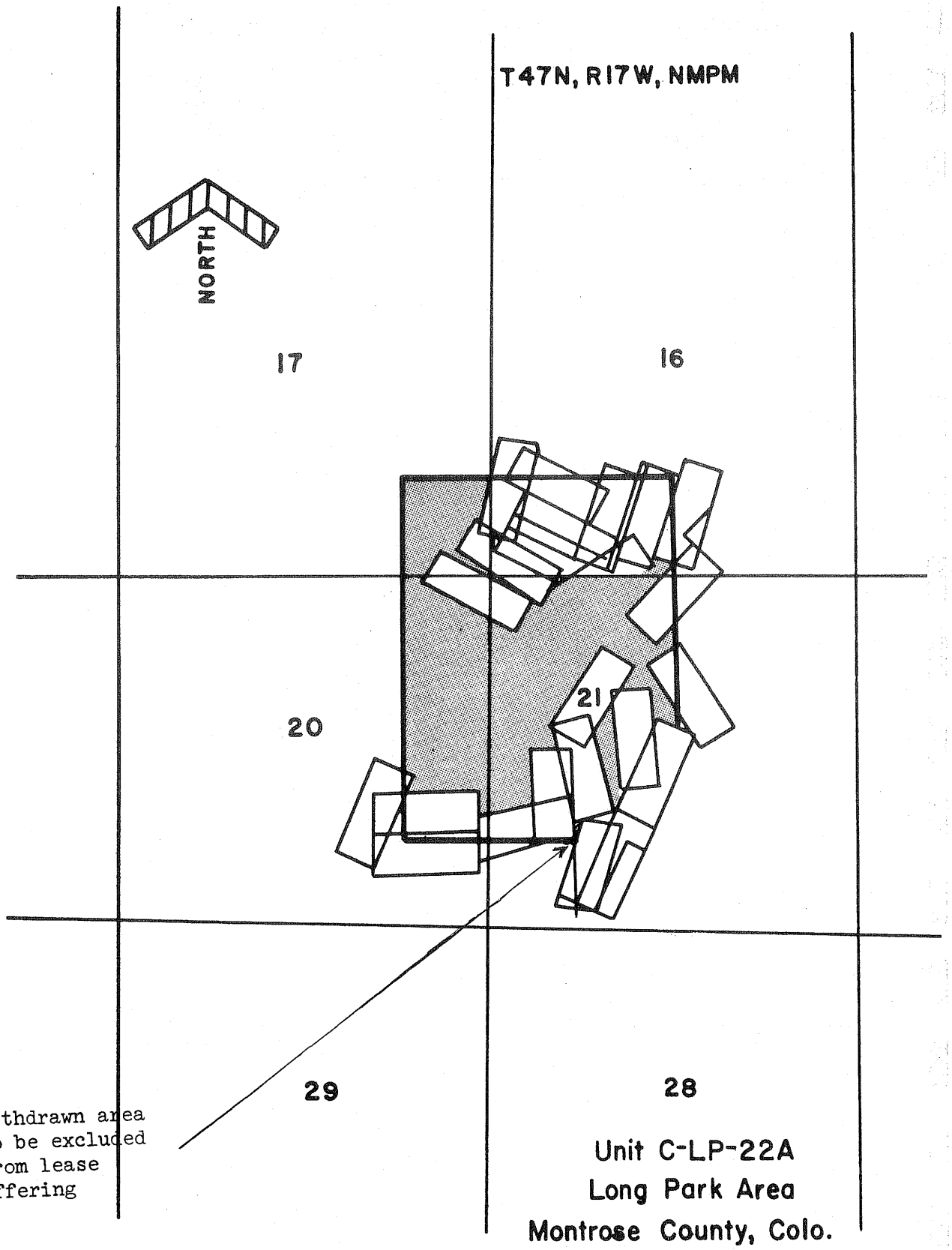
Long Park Area
Montrose County, Colo.



Unit C-LP-22

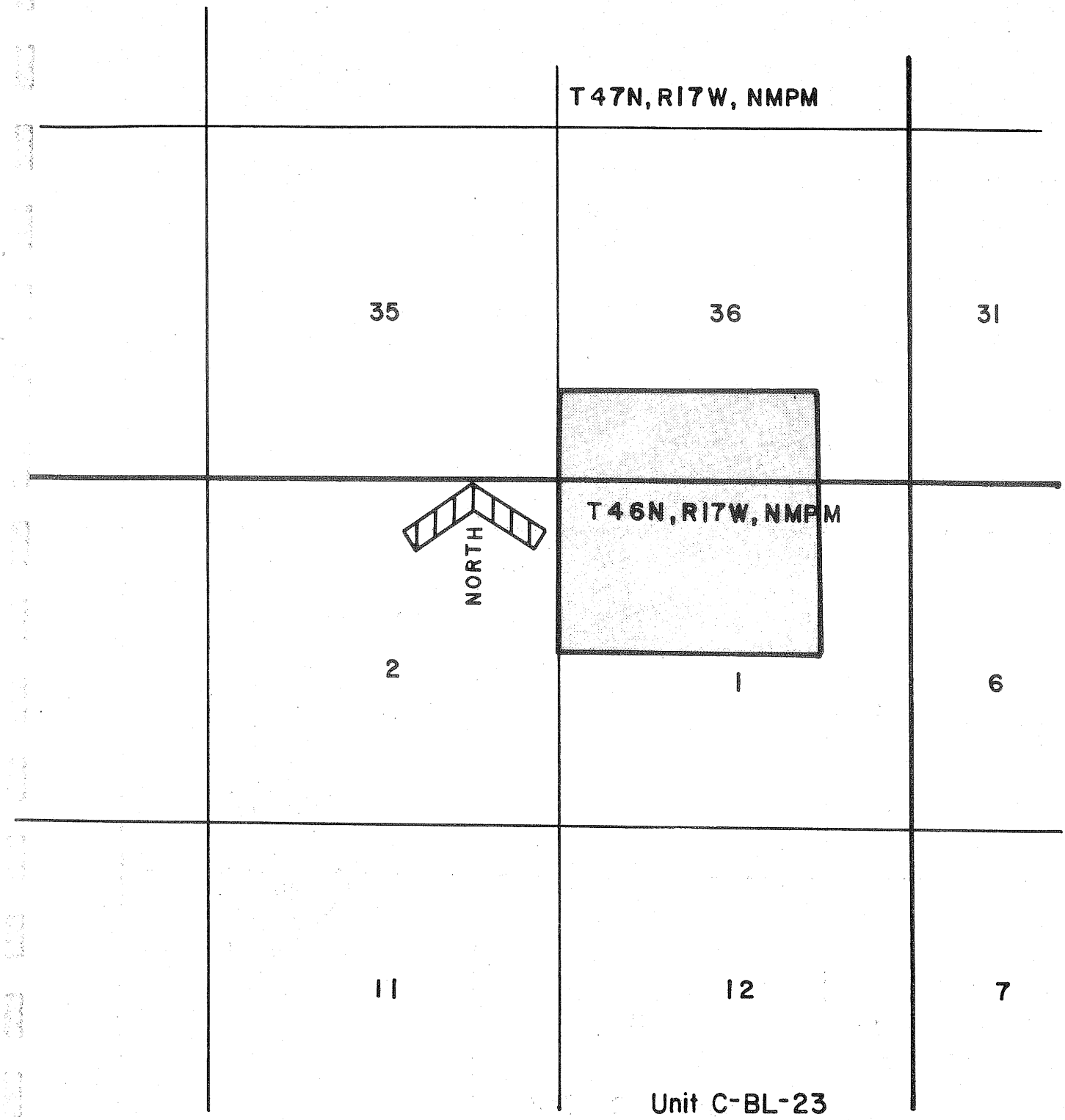
Long Park Area

Montrose County, Colo.

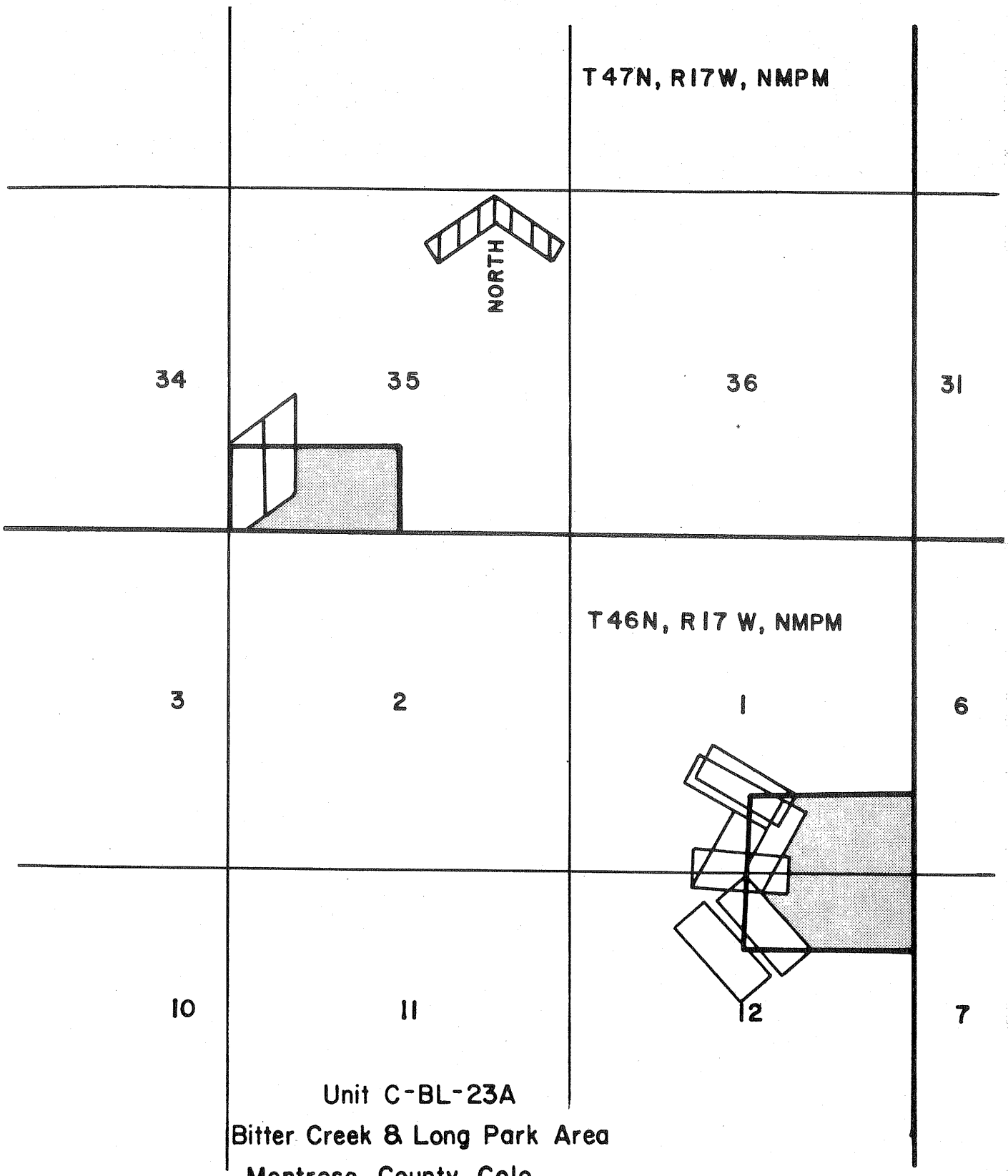


Withdrawn area to be excluded from lease offering

Unit C-LP-22A
Long Park Area
Montrose County, Colo.

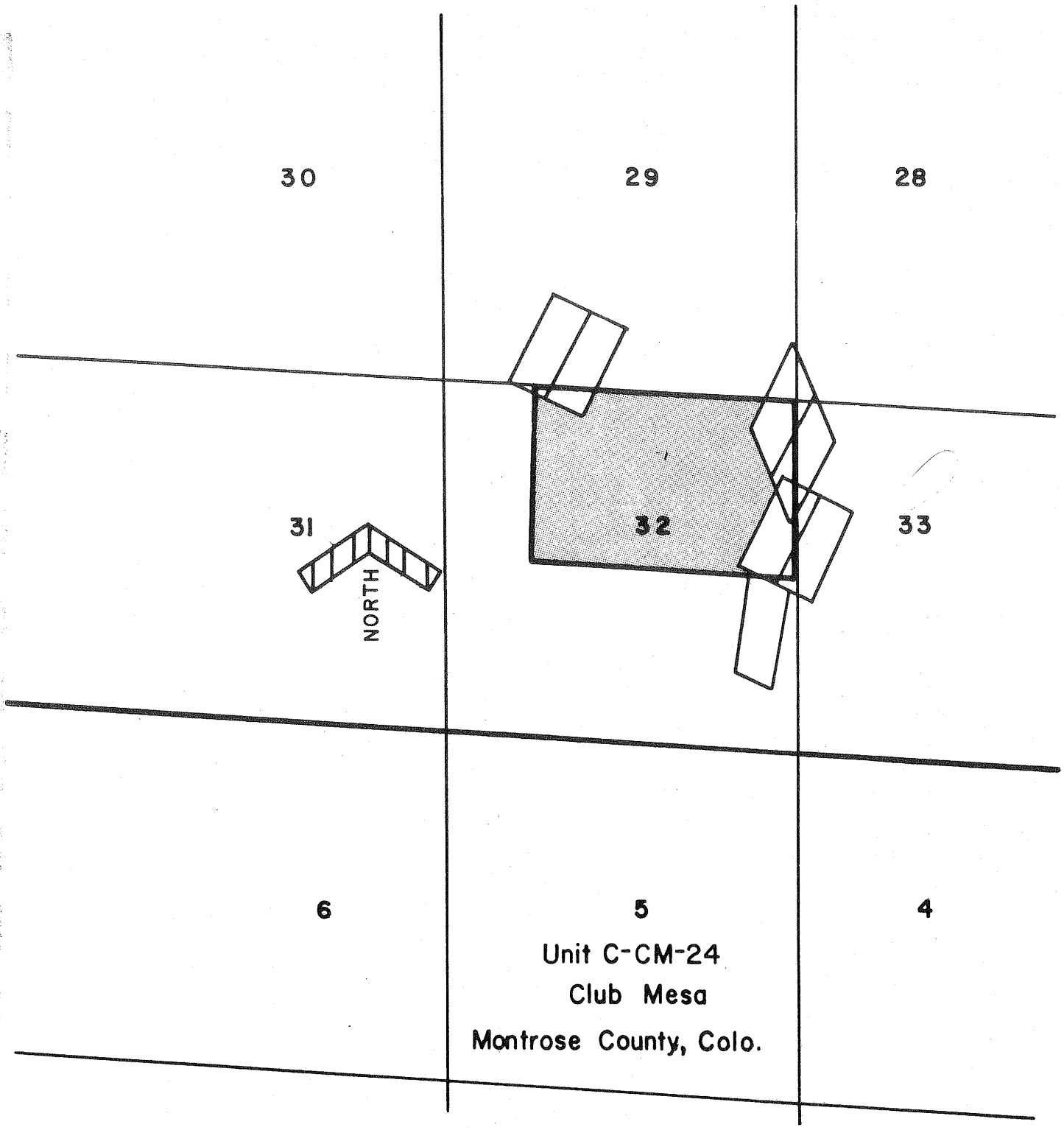


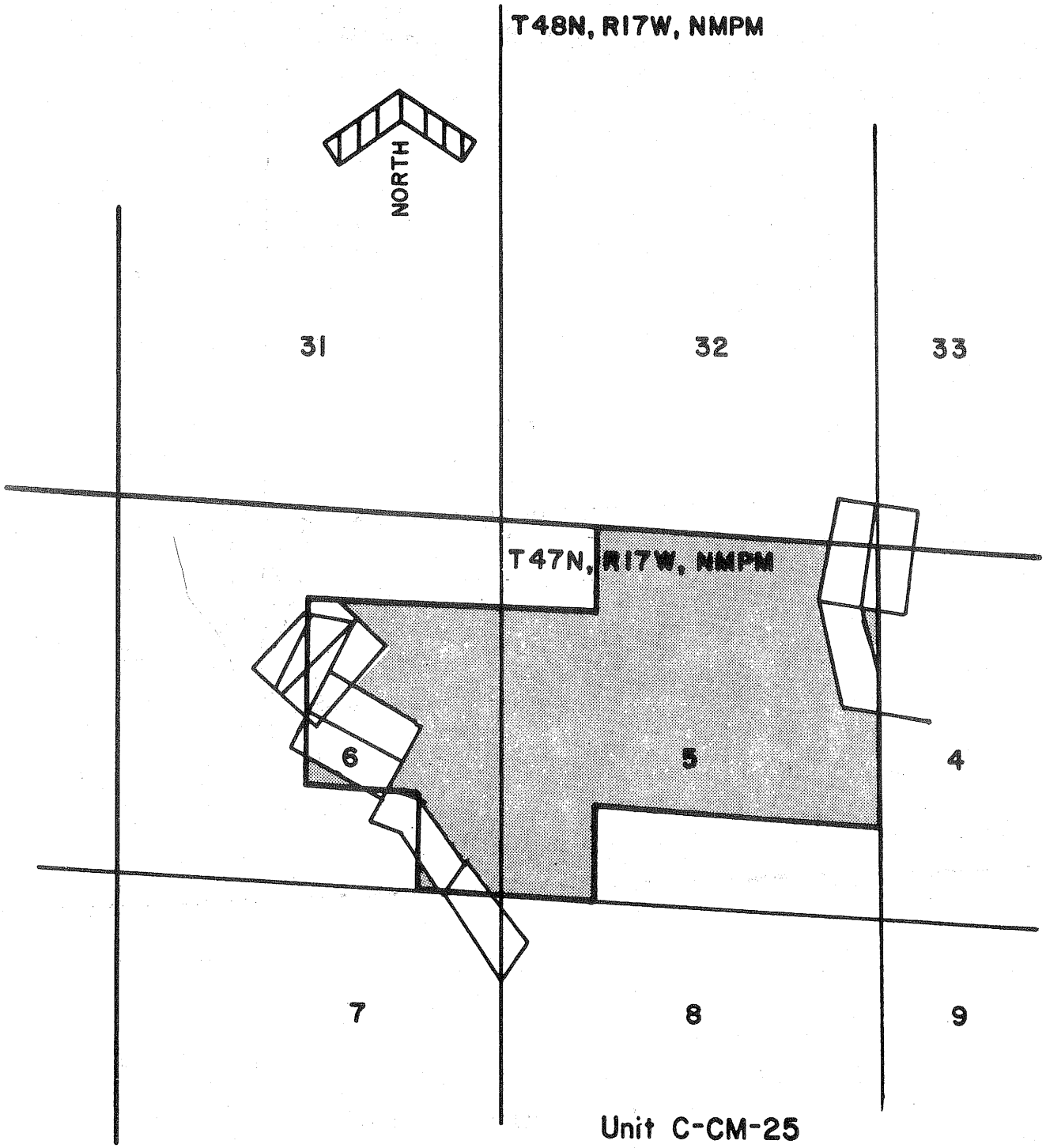
Unit C-BL-23
Bitter Creek & Long Park Area
Montrose County, Colo.



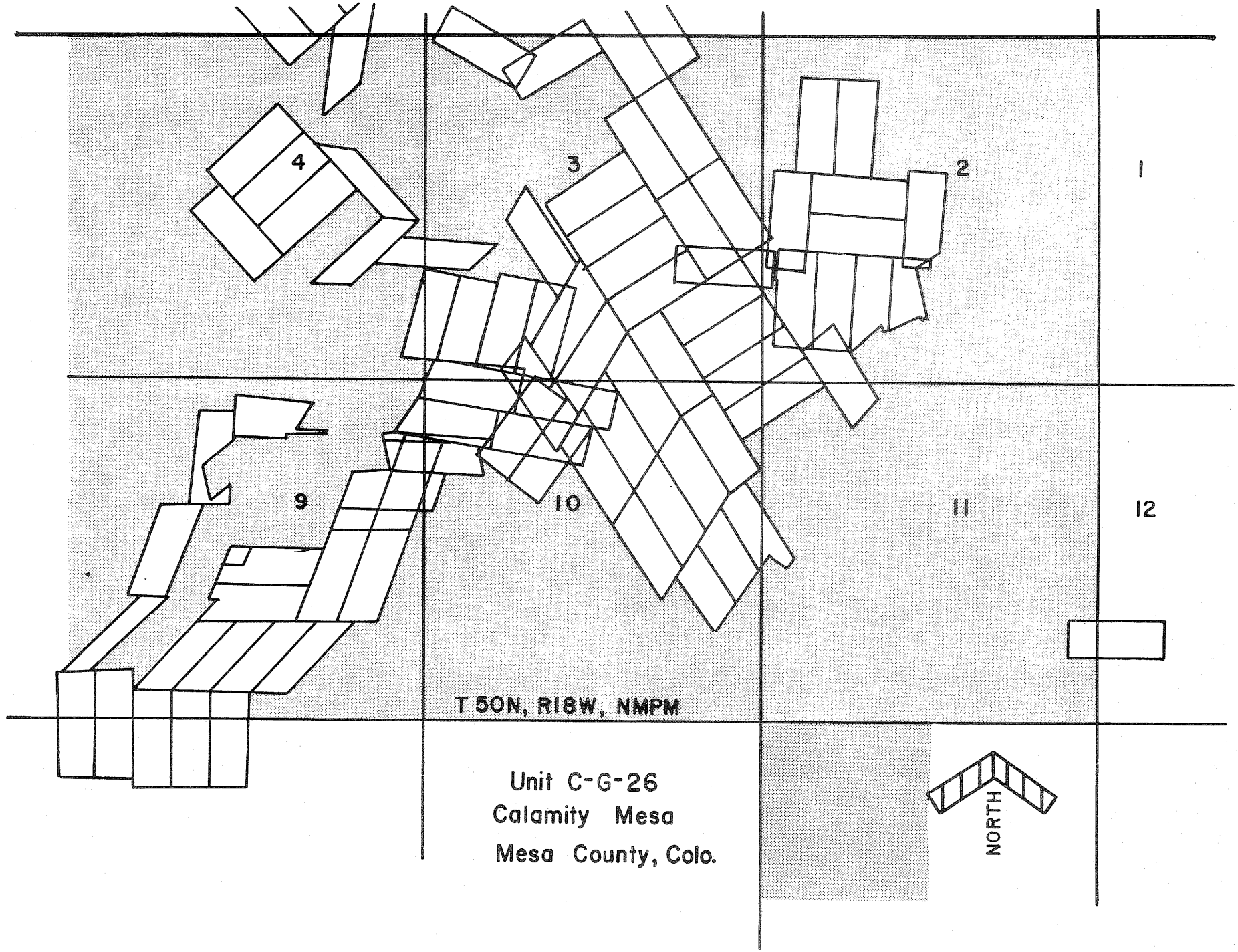
Unit C-BL-23A
Bitter Creek & Long Park Area
Montrose County, Colo

T 48N, R17W, NMPM





Unit C-CM-25
Club Mesa & Tramp Area
Montrose County, Colo.


4
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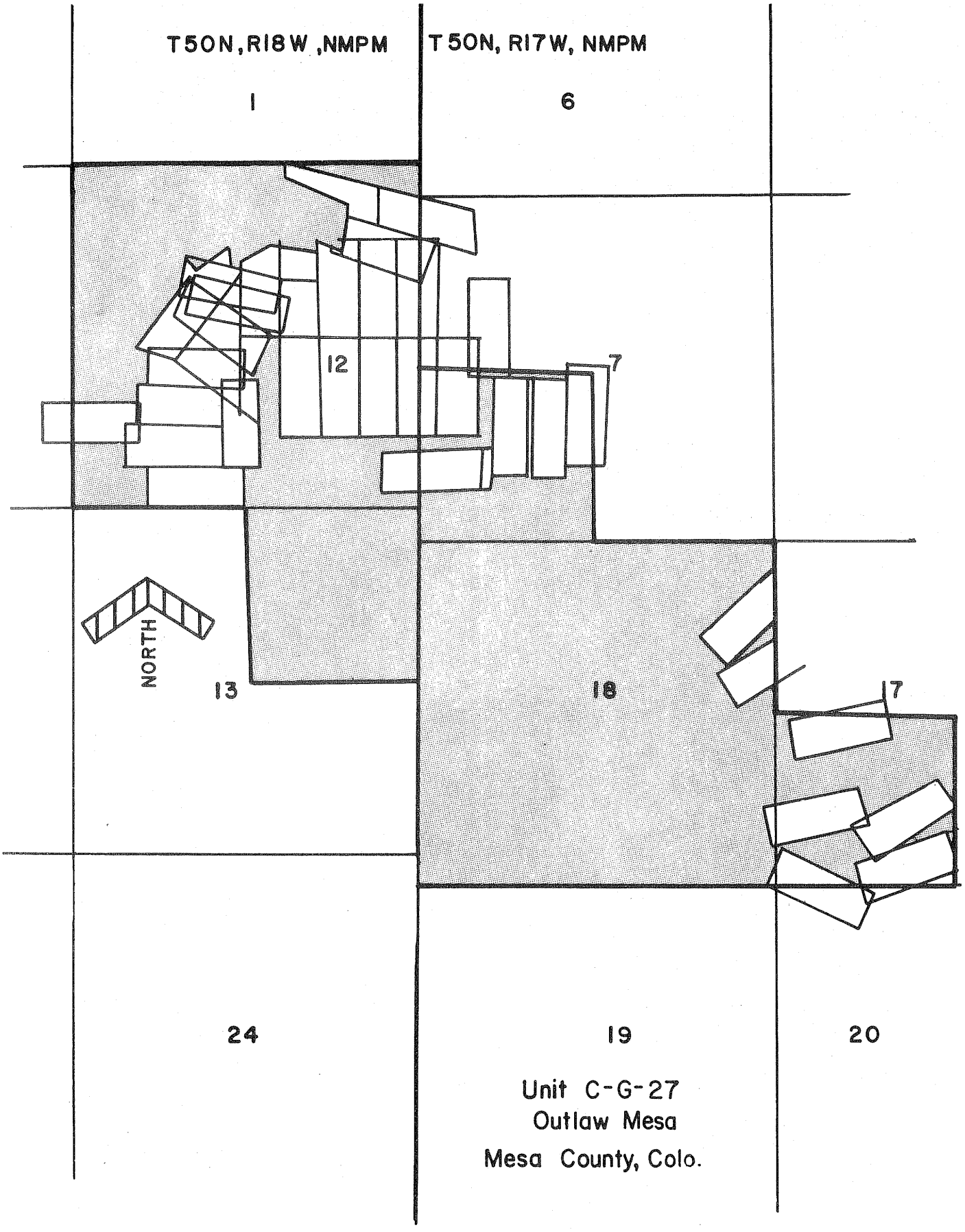
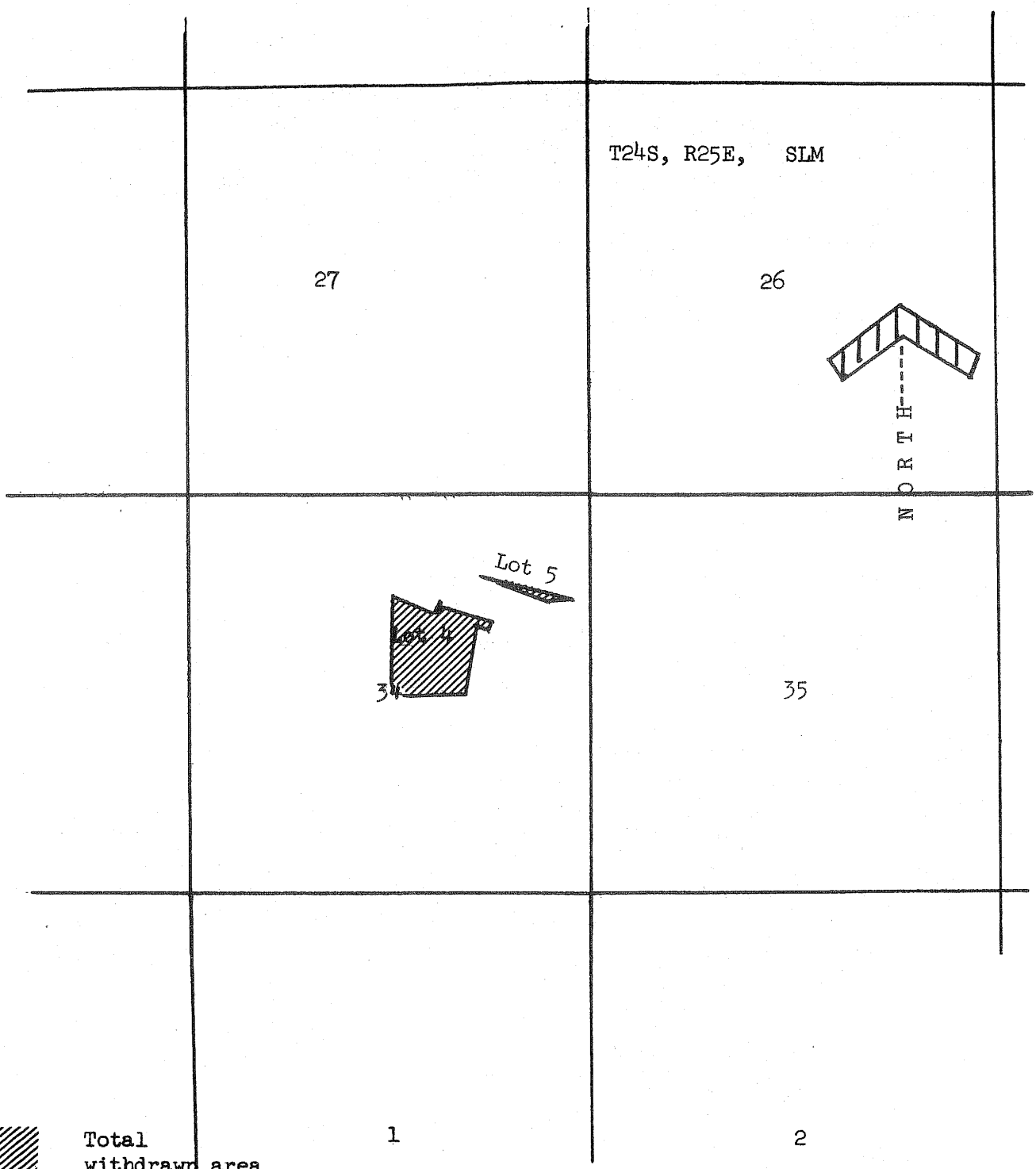
Unit C-G-26
Calamity Mesa
Mesa County, Colo.
NORTH



Unit C-G-27
Outlaw Mesa
Mesa County, Colo.

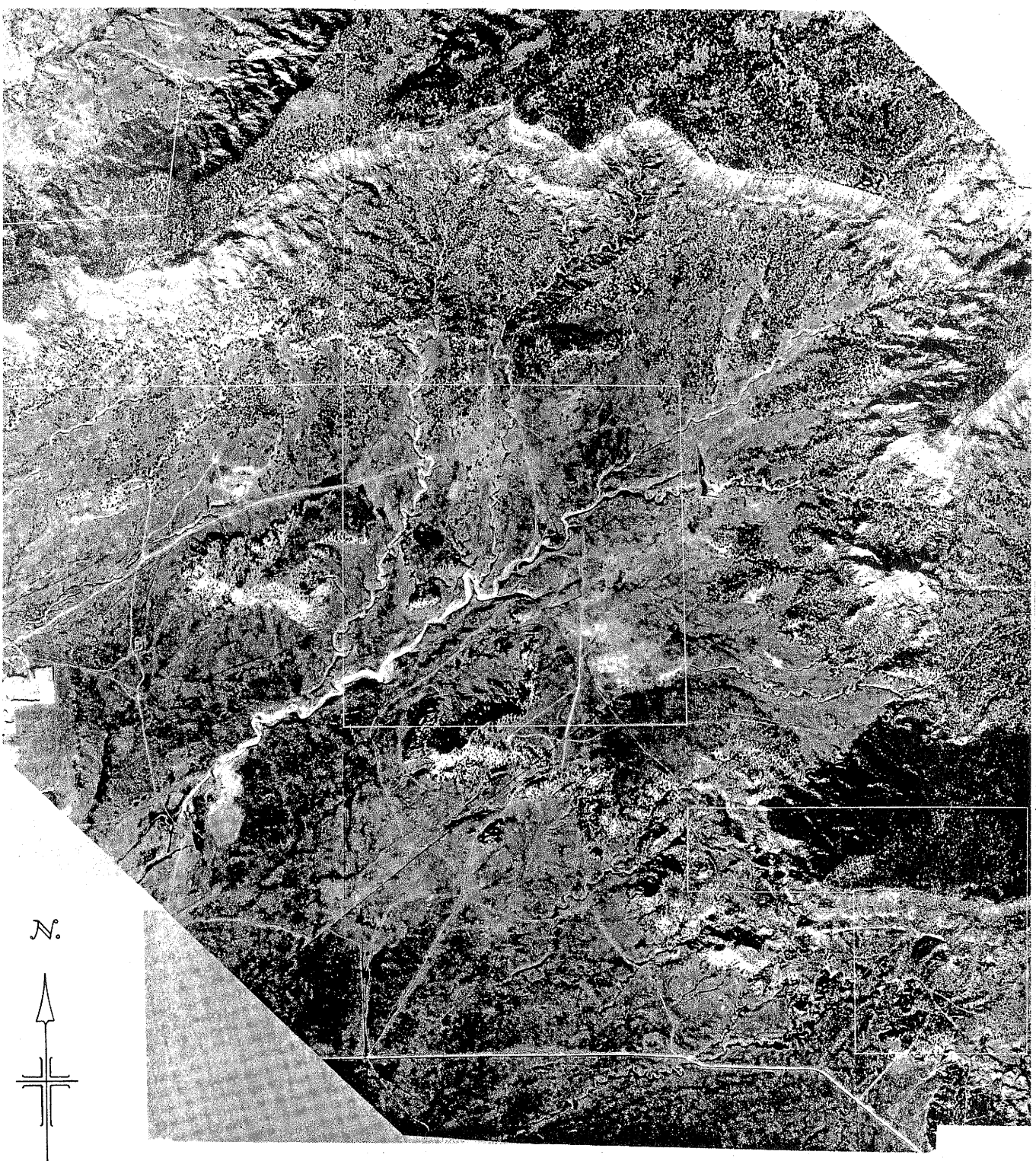


Total withdrawn area to be excluded from lease offering

UNIT U-PM- 28

POLAR MESA AREA

GRAND COUNTY, UTAH

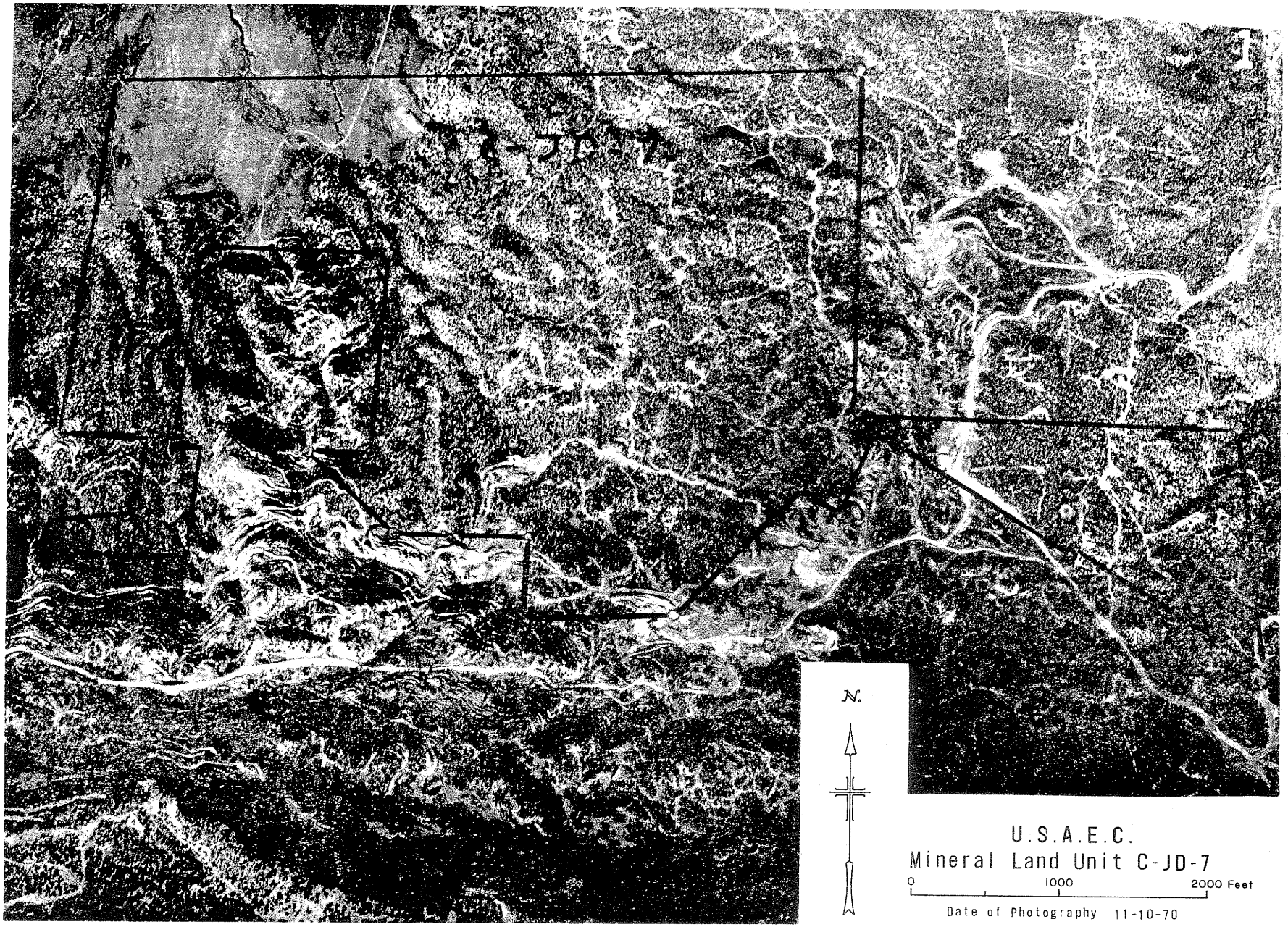


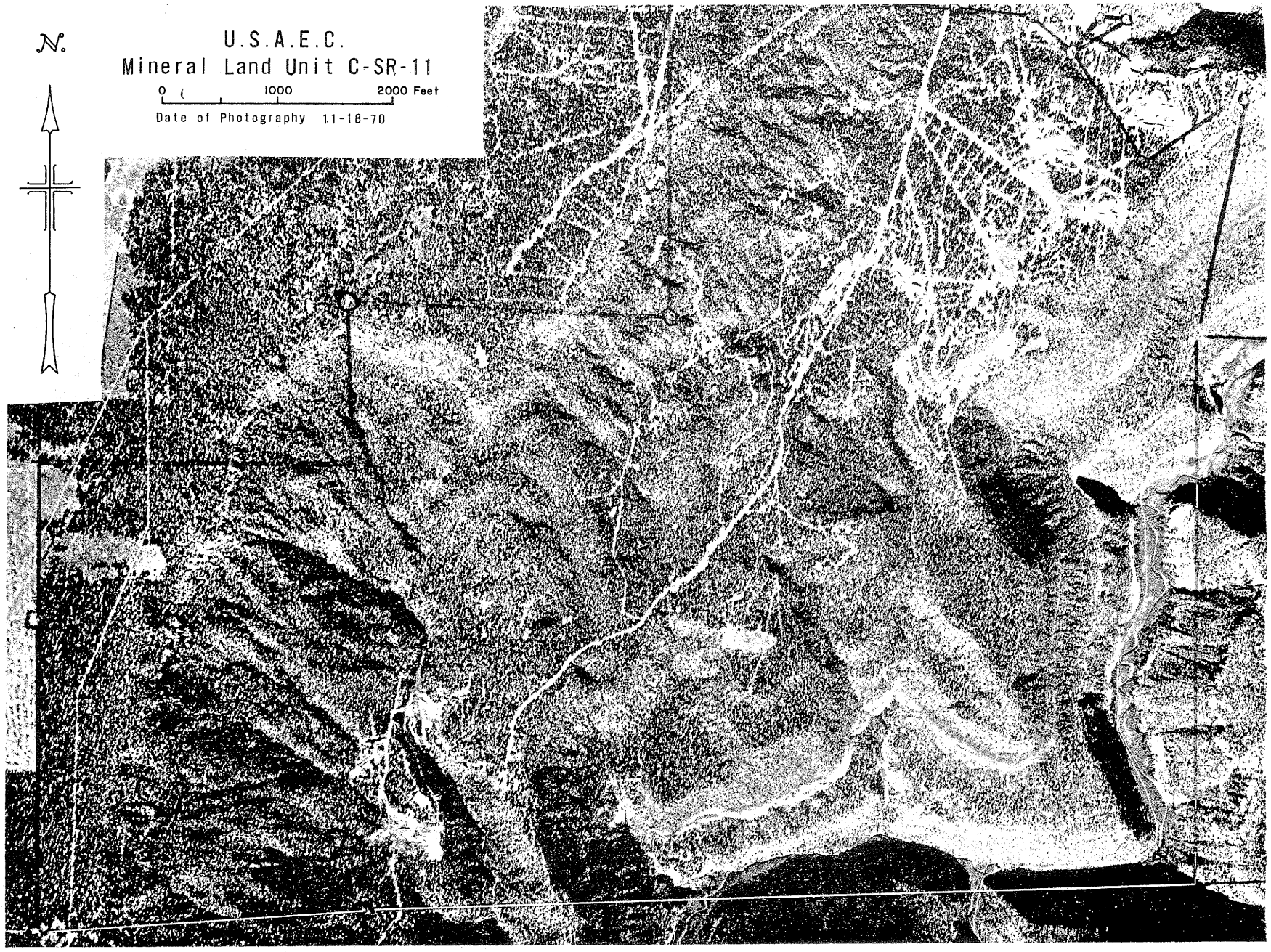
N.

U.S.A.E.C.
Mineral Land Unit NM-B-1

0 2000 Feet

Date of Photography 10-3-70


C-JD-7
N.
U.S.A.E.C.
Mineral Land Unit C-JD-7
0
1000
2000 Feet
Date of Photography 11-10-70


N.
U.S.A.E.C.
Mineral Land Unit C-SR-11
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1000
2000 Feet
Date of Photography 11-18-70

U.S.A.E.C.
Mineral Land Unit C-SR-12
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Date of Photography 6-27-69
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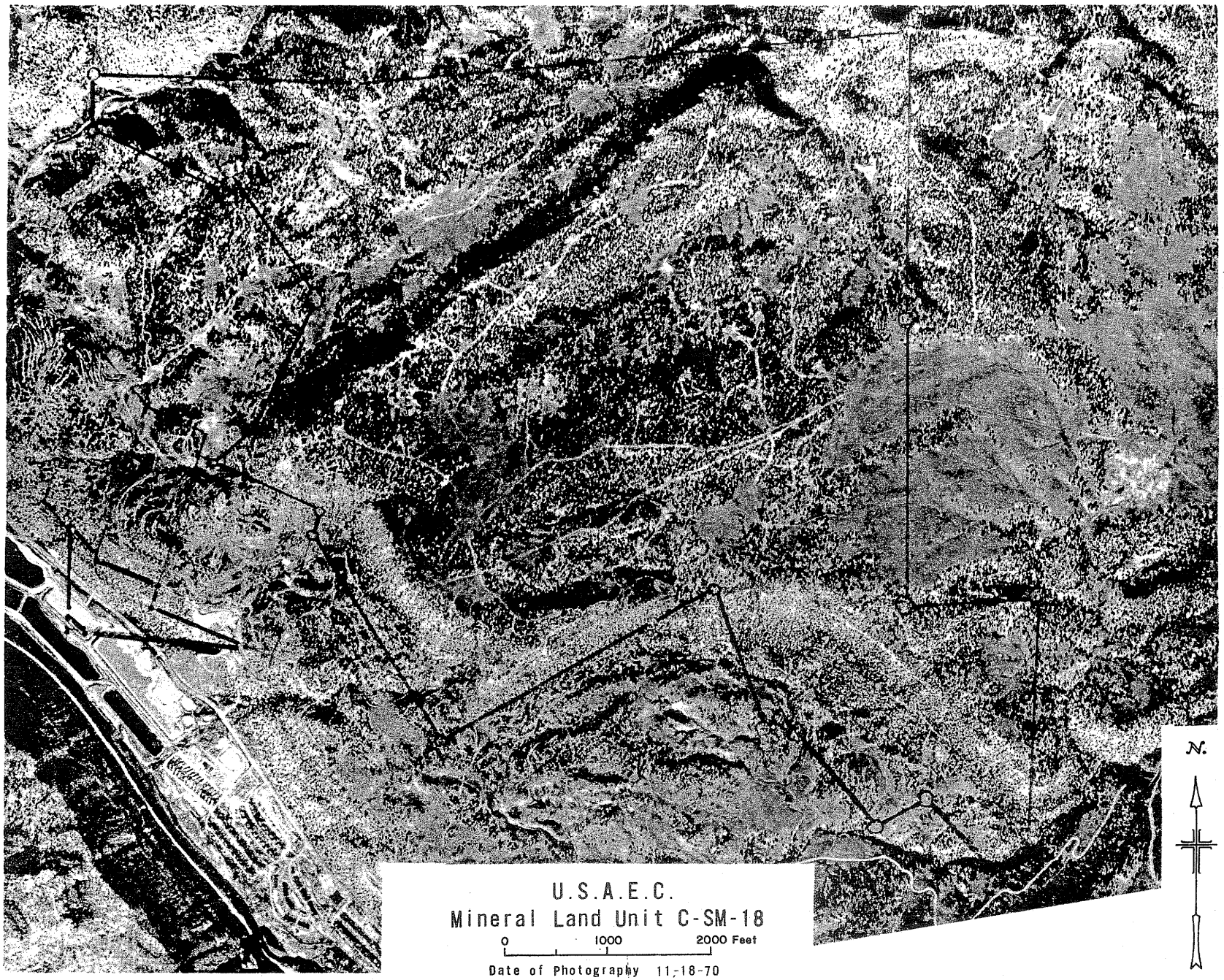
U.S.A.E.C.
Mineral Land Unit C-SM-18
0
1000
2000 Feet
Date of Photography 11-18-70
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APPENDIX C

SURFACE PROTECTION EXAMINATION, BLM STIPULATIONS AND RECOMMENDATIONS

The BLM and Forest Service members of the multi-disciplined team included the following resource specialists reviewing the subjects enumerated below:

Resource Specialist	Coverage
Planning Coordination	Planning and Land Use Controls
Landscape Architect/ Recreation	Recreation, Archaeology and Aesthetic Values
Soil Scientist	Soil and Watershed
Agricultural Engineer	Engineering
Wildlife Management Biologist	Wildlife
Range Conservationist	Livestock Grazing
District Ranger, Moab	U.S. Forest Service Lands
District Ranger, Monticello	U. S. Forest Service Lands
BLM, New Mexico	Lands In New Mexico
BLM, Utah	Lands in Cottonwood Wash Area, Utah
Geologist/Realty	Lands, Minerals, Recreation and Forestry

In addition, the AEC and Lucius Pitkin, Inc., an AEC contractor supplied expert assistance in the fields of geology and mining.

The following assumptions were used by BLM in its review:

A. The lease offering will take place over a period of about one year.

B. All leases will include both the opportunity for exploration and mining.

C. The mining program will probably be over a 10-15 year period.

D. There could be a new processing mill emerge in the area because of the mining program. The mill will not be on a lease site, but close to a river or water supply. The mill will be an AEC licensed facility and an environmental statement will be prepared at that time.

E. No large influx of population into the area is anticipated because of this leasing program.

F. The ore produced will go to the commercial market.

The foregoing assumptions have been reviewed by AEC and appear reasonable.

The team examined the lands in Colorado, New Mexico, and Utah during the months of April and May, 1971. Both aerial and on-the-ground reconnaissance were made.

General Stipulations

The BLM suggested a list of general stipulations which would apply to essentially all the lands involved. Many of these are more or less standard stipulations used by BLM in its own leases, and may require some rewording to make them more pertinent to the mining leases contemplated in this program, for which AEC has administrative responsibility. In general, however, it is the AEC's intention to utilize the suggested stipulations wherever applicable. An example of an inapplicable stipulation is No. 10, which is not compatible with the conduct of exploration and mining activities.

No's 2, 8, 9, 19, 21, 22, 23, 25 and 26 apply not to environmental considerations, but to other property values, safety, and procedural matters. While these subjects will be covered in the leases along with other requirements, they are not primarily environmental concerns.

BLM List of
General Stipulations

1. Before any exploration activities may be authorized, the lessee must post a bond to cover estimated reclamation costs and to insure compliance with the surface protection stipulations of the permit. An increase in the amount of the bond may be required at any time during the life of the lease on approval of a mining plan or an approved change in plans or to reflect changing surface conditions.

2. All existing improvements used by the lessee such as fences, gates, cattle guards, roads, trails, culverts, pipelines, bridges, public land survey monuments and water development and control structures shall be maintained in serviceable condition to the degree practicable. Damaged or destroyed improvements shall be replaced, restored, or appropriately compensated for. When it becomes absolutely necessary and only upon prior approval of the Bureau of Land Management through the A.E.C. the lessee may disturb a public land survey corner marker or monument. However, the lessee shall bear all costs of any surveys required to preserve the true point of the marker.

3. Housing and other facilities and services related to community or urban development shall be kept to a minimum on the lease premises and shall require the written approval of the surface manager prior to construction or location thereon of the facilities.

4. Any surface building or support facilities may be constructed or located only in areas approved by the surface manager. At termination of the lease the lessee agrees to remove or otherwise dispose of any such structures to the satisfaction of the surface manager.

5. All operations under this permit shall be designed and performed so as to make use of the natural topography to achieve harmony with the landscape to the degree practicable.

6. Drill holes, excavations, and improvements shall be conditioned at all times to prevent injury to persons, livestock and wildlife.

7. Where compatible with operations being conducted, the permit area shall be available for other public surface uses, including livestock grazing, hunting, fishing, camping, hiking and picnicking.

8. Grazing or resting livestock shall not be unnecessarily disturbed.

9. Access to the permit area is not guaranteed by the Government. The lessee has the responsibility of securing access rights-of-way.

10. No off-road travel will be permitted except in an emergency.

11. Where practicable existing roads shall be used. Activities employing wheel or track vehicles shall be conducted in such a manner as to minimize surface damage. If damage occurs the road shall be restored to original or near original condition as soon as possible.

12. All new roads and trails shall be constructed and maintained in such a manner as to control and minimize channeling or other erosion. Roads and trails shall be constructed only at locations and to specifications approved in advance by the surface manager.

13. All operations must be conducted so as not to adversely change the character or cause pollution of streams, lakes, ponds, waterholes, seeps and marshes or damage to fish and wildlife resources. Contaminants or pollutants shall be controlled and not be allowed to enter streams, springs, stock waters, or ground waters. No water shall be used from stock ponds or springs without the written consent of the owner. The lessee shall be required to comply with all Federal and State laws, regulations and standards relating to air, water and land pollution.

14. The clearing of timber, stumps and snags shall be kept to a minimum and due care shall be used to avoid scarring or removal of ground vegetative cover in areas not involved in the operations.

15. All disturbed areas must be returned as nearly as practicable to their original condition, or to a condition to be agreed upon by both the lessee and the surface manager as to the satisfactory standards for such reclamation. This reclamation should be accomplished as soon as practicable after the damage has occurred.

16. When American antiquities or other objects of historic or scientific interest including but not limited to historic or prehistoric ruins, vertebrate fossils, or artifacts are discovered in the performance of this permit, the item(s) or condition(s) will be left intact and brought immediately to the attention of the surface manager.

17. If the Bureau of Land Management archaeologist or a Bureau of Land Management approved archaeologist determines that the areas to be used for development contain potential archaeological values, the lessee will engage a recognized authority on archaeology acceptable to the Bureau of Land Management to survey and salvage in advance of mining. The responsibility and cost of this survey and salvage will be that of the lessee.

18. The lessee shall be required to comply with all Federal and State mine safety laws, regulations and standards.

19. Exploratory operations shall not be conducted on the lands, which, in the opinion of the U. S. Geological Survey Regional Mining Supervisor, would constitute a hazard to oil and gas production or that would unreasonably interfere with the orderly development and production under oil and gas leases issued prior to the date of this lease.

20. All solid or liquid waste shall be disposed of by using accepted State and Federal disposal methods and following the State and Federal laws, regulations and standards.

21. Explosives will be handled in accordance with State explosive laws.

22. The lessee(s) or their assignees will make available to the A.E.C. any scientific, geological, or mineralogical data that the authorized officer may request from exploration drilling. Such information can be made available at the discretion of the A.E.C. after consultation with the lessee(s) or their assignees.

23. No salable minerals, such as sand, gravel or stone, found on the same lands covered by the lease will be used by the lessee or their assignees for exploration, or mining development purposes unless said salable minerals have been purchased from the United States under the provisions of the Materials Act of July 31, 1947 (61 Stat. 681).

24. The permittee shall comply with the county planning and zoning resolutions, subdivisions regulations, and mobile home regulations, with approval presented to the surface manager.

25. Prior to commencing any on-the-ground activities, the lessee shall submit to the surface manager five (5) copies of a mining plan which sets forth the operational steps to be followed in complying with each surface management stipulations. Proposed access routes and operational sites will be illustrated on a topographic map, $7\frac{1}{2}$ minute quadrangle, or aerial photograph when available. This plan shall be approved by the surface manager in advance of any and all operations.

26. A copy of these stipulations and the approved mining plan will be at the operating site. Operations which are not in accordance with the approved plan shall constitute a violation of the lease.

Special Stipulations

These stipulations cover situations that are peculiar to a specific unit, site, or tract of land.

NM-B-1

1. No roadways or mine portals shall be allowed on the south or west facing sides of the Haystack or Goat Mountain escarpment above 7,300 feet and 7,100 feet respectively.

2. This unit contains an open park area. In the open park areas where there is either a grass, shrub, or sagebrush cover, it shall be disturbed as little as possible. If the shrub or brush cover is too high, the grading or dozing shall be at ground level.1/

3. Surface rights for this unit are with the Bureau of Indian Affairs. Please contact them for further special and general stipulations.

U-CW-2

General stipulations cover this unit.2/

U-H-3

1. The lessee will not undertake any drilling, construction of roads and pipelines, or any other activity which involves removal of vegetation until a plan of construction and development has been approved by the Forest Service representative. Such approval may be conditional on the reasonable requirement to prevent erosion, water pollution, or damage to surface resources to provide restoration of the surface.

2. This tract of land is within the winter range for elk, deer, and sizable flock of turkey. Any surface disturbance should provide for protection of roost trees and watering areas. Restoration of disturbed

1/ This stipulation applies also to areas in units 6, 8, 9, 12, 16, 17, 20, 21, 22, and 27.

2/ Similarly, there were no special stipulations for units 5, 7, 10, 11, 11A, 15, 18, 19, 22A, 24, and 25.

areas should include a heavy portion of browse seed and Russian wild rye.

3. Access to the withdrawal site is across forest land over old, poorly drained roads. All roads used for access should be properly drained with culverts and/or water bars and reseeded to stabilize them. If road construction becomes necessary the standards will be determined by the Forest Service.

U-E-4

1. The lessee will not undertake any drilling, construction of roads and pipelines, or any other activity which involves removal of vegetation until a plan of construction and development has been approved by the Forest Service representative. Such approval may be conditional on a reasonable requirement to prevent erosion, water pollution, or damage to surface resources and to provide for restoration of the surface.

2. This unit contains two unique species of animals. Care should be taken to protect all forms of trees from destruction. Exploration work and the location of mine shafts or buildings should avoid areas where pocket gopher activity is present.

3. All readily identifiable petrified wood shall be set aside and stockpiled with as little crushing and breaking as possible.

4. Mine portals and access roads shall be located to minimize visual impact from the vicinity of the existing roadway at Bear's Ears.

5. Access to the withdrawal site is across forest land over old, poorly drained roads. All roads used for access should be properly drained with culverts and/or water bars and reseeded to stabilize them. If road construction becomes necessary the standards will be determined by the Forest Service.

C-SR-13

1. Because of the Dolores River's potential as a scenic and wild river extra special precautions must be taken to assure that exploration and mining waste do not contaminate the esthetic value or the river itself.1/

C-BL-23

1. No Ponderosa Pine will be cut without the written permission of the surface managing agency.

C-G-26 and 27

1. Human disturbance and location of dwellings and mines as shown in Olver report, figure 1, should be avoided.2/

The AEC intends to adopt these special stipulations, although for Unit NM-B-1 it plans not to lease Sections 3 and 11 as noted in this section headed "Present Land Uses." For C-SR-13 and possibly other units, specific wording may be modified to more clearly define limitations on the prospective lessee.

The AEC intends to use stipulations to accomplish the following objectives in the interest of preserving the aesthetic values of the Dolores River and its canyon:

C-SR-13A

1. Prohibit mining or exploration activities at elevations below the pre-Morrison formation (the 5,600 foot contour) in Sections 24 and 25, T44N, R19W, NMPM.

2. Prohibit the practice of dumping mine wastes over the rim and down into the canyon.

1/ This stipulation applies also to units 13A and 14.
2/ This refers to possible disturbance of deer migration routes near Outlaw Mesa.

C-SR-13 and 14

Prohibit mine waste dumps and ore storage within 200 feet of the river bank.
(Note: Existing access roads are within 200 feet of the river. Road maintenance is necessary and improvements should be allowed with AEC approval. County maintained unpaved and paved roads are alongside the river through parts of these units.)

C-AM-19

1. Prohibit mining or exploration activities at elevations below the Entrada formation (the 5,500 foot contour) in Sections 13 and 24, T49N, R18W, NMPM.

2. Prohibit the practice of dumping mine wastes over the rim and into the canyon.

These three units adjoin the Dolores River in areas that are reasonably well covered by private claim holdings with extensive evidences of exploration and mining. Additional activity, guided by environmental awareness should not further degrade the area.

BLM Recommendations

The BLM made a number of recommendations concerning general procedures and actions it considered desirable. These recommendations are as follows:

A. The surface of the following units, in the areas delineated, should not be subjected to any disturbance, primarily due to the high aesthetic and recreational value of the area.

All of C-SR-11 and 11-A and the NW$\frac{1}{4}$ section of both Sections 16 and 10 of Unit C-SR-16 because of the high value of Summit Canyon for a historic trail. (Possible route of the Escalante expedition in 1776.)

Those portions of Units, C-SR-13A, C-SR-14, and C-AM-19 that are visible from the Dolores River Canyon should be protected from surface disturbance due to the irreparable damage which would occur from the mining and ensuing erosion. It is understood that this portion of C-SR-13A is below the ore horizon.

B. A performance bond should be established to cover surface protection and reclamation which would be large enough to provide adequate funds for reclamation should the lessee forfeit. A standard bond of $5,000 is recommended as a base figure. This bond would be adjusted up or down, depending on the size, environmental complexity, and desired final condition of the land. The exact amount would be set after an operating plan had been submitted, taking the above factors into consideration.

C. Set up a funding program possibly with the U. S. Forest Service and the Bureau ofLand Management, to cover restoration of extreme surface damage that occurred during a previous mining era.

D. An exploration plan and mining plan of proposed operations should be required. The plan will consider the attached stipulations, cover the items listed in the attached outline, and be approved by the surface managing agency for surface related operations.

E. The surface managing agency will accompany the Atomic Energy Commission in on-the-ground compliance inspections of exploration and mining before, during, and after operations to insure minimal damage to the surface resources.

F. The Atomic Energy Commission should make a concerted effort to "tell their story" about this proposed leasing program to other federal agencies, state and local governments, and the general public. Involvement of the public in the Commission's decision making process is mandatory. Such groups as the Colorado Open Space Coordinating Council, Rocky Mountain Center on Environment, Colorado Mining Association and other groups should be contacted.

G. The Commission should prepare an environmental statement as called for under Section 102(2)(c) of the National Environmental Policy Act of 1969. Counsel on Environmental Qualities guidelines must be followed.

H. Whenever practicable existing improvements such as roads, shafts, buildings, headframes, even waste dumping areas should be utilized to restrict further degradation of the surface ecology.

I. An intensive review of existing land uses such as special land use permits, easements, rights-of-way, grazing allotments, fences, and other improvements should be undertaken to establish the current need and to determine if their prior right precedes the Atomic Energy Commission's withdrawals.

Of these nine recommendations all but Recommendations A and C are substantively in accordance with the general plans AEC intends to follow. Recommendations B and D are included in BLM's general stipulations nos. 1 and 25.

With respect to Recommendation C, the AEC cannot set up a funding program for restoration of land surface except through the normal budgetary process. Monies realized from the leases cannot be spent for any purpose without Congressional authorization. As noted previously, AEC intends to include stipulations for cleanup in leases on AEC controlled ground. This, however, will make only a small contribution toward alleviating problems resulting from all of the mining

in the region in a previous era. By far the greatest part of this activity has taken place on private mining claims located on public lands. These are lands over which the AEC has no jurisdiction, nor has it ever had. As previously noted AEC controls only 3.3% of the acreage held for uranium exploration and mining in the Uravan Mineral Belt as of October 15, 1971.

In view of Recommendation A, the AEC has restudied the situation with respect to units C-SR-11 and 11-A in particular, and also the NW$\frac{1}{4}$ section of both Sections 16 and 10 on Unit C-SR-16 to determine the impact of following this recommendation on the program, and also to examine possible alternatives.

It was found that:

1. Units C-SR-11, and 11-A contain important reserves and potential, with probable value in the millions of dollars.
2. Extensive mining has already taken place in this area, both on and near the AEC controlled lands.

3. The mineralized areas are along a high bench and are for the most part out of sight from the road along the bottom of Summit Canyon.

4. The visual impact of mining and exploration operations in the lease areas, C-SR-11 and 16, can be effectively reduced by lease stipulations that:
   A) Prohibit mining or exploration activities at elevations below the Entrada Formation (the 6,700 foot contour) in Sections 10, 16, and 17 of Township 43 North, Range 19 west, NMPM;
   B) Prohibit rim adits or rim stripping on the Summit Canyon walls; and
   C) Prohibit the practice of dumping mine wastes over the rim and down into the canyon.

5. The review produced evidence indicating that the Escalante party probably traveled down Bishop Canyon to the point where it joins Summit Canyon near the south-east corner of C-SR-11. Unit C-SR-11A would not be visible from this route, and thus does not appear to be involved in the possible future historic trail. Nevertheless, for aesthetic considerations alone, stipulations similar to those for units 11 and 16 will probably be applied to it.

In view of the finding that mining can be conducted in these units without significant adverse impact on aesthetic or historic values, AEC plans to lease these units with stipulations as noted under item 4, above.

Some observations on this area are given below:

There is considerable doubt in the minds of people familiar with the area that the Escalante route traverses the portion of Summit Canyon above its confluence with Bishop Canyon. It is believed, by people who have studied the area, that the Escalante party entered Bishop Canyon which is tributary to and joins Summit Canyon near the southeast corner of Unit C-SR-11. In that case, only Units C-SR-11 and C-SR-16 are involved with the Escalante route.

Only minor portions of Units 11, 11A, and 16 are visible from the Escalante route. The road is about 800 feet below the ore bearing formation and the sides of the canyon are steep enough to preclude seeing out of the canyon in most places. Thus the area of interest for mining is largely out of the line of sight from the road along the canyon bottom. The major impact from the viewpoint of the trail rider or hiker would result if mine

wastes were allowed to fall over the edge of the rim and down the canyon walls. It is possible, however, that some mining activities on the proposed lease areas of Unit C-SR-11 and C-SR-16 could be observed from a few points along the Escalante route. The area is not a primitive one; it is predominately a mining area. Evidence of numerous private mining and exploration activities dating back 30 to 60 years is clearly visible along the probable route of the Escalante party down Summit Canyon and its tributary. Some of these private properties will be worked again when demand for uranium is more acute. Also, an ore haulage road exists down part of the canyon, and a jeep road exists down the remainder of the canyon. The spring that is probably Escalante's "Agua Escondida" has been piped into a stock watering tank, and the valley south of the spring is fenced and cultivated, being private patented land.

APPENDIX D

ECONOMIC DEPENDENCE OF THE URAVAN MINERAL BELT AREA ON URANIUM-VANADIUM PRODUCTION

Two studies have been made recently containing information on the relationship and importance of the uranium mining activities to the overall economy of the region in which most of the AEC controlled uranium bearing lands are located. Both studies note the unusually heavy dependence of this region on a single industry, the mining and milling of uranium-vanadium ores.

The Arthur D. Little study was made for the Federal Radiation Council to assess the potential economic effects of lowering the limits for exposure to radon and its radioactive decay products in uranium mining. Observations on employment, population and income from uranium operations in western Colorado are quoted.

The Four Corners Regional Commission in an effort to determine the potential for diversification of the economy of the San Miguel Basin recently had a study made by the Denver Research Institute. The Uravan mill and most of the AEC controlled lands are in this Basin. Information on the economy of the Basin has been drawn from this report.

Two other sources used are an annual survey by AEC on employment in the uranium industry, and information supplied by Union Carbide Corporation on its uranium production operations in Colorado.

1. Arthur D. Little, Inc. Study /1/

   The following information derived from a study made for FRC by Arthur D. Little, Inc. (ADL) and published in September 1970,

indicates the importance of the uranium industry to the economic welfare of the Uravan region:

"Grand Junction, the largest city of Western Colorado, with its population reaching about 23,000 is the region's trade center and de facto capital. It has less than half of Mesa County's total population but accounts for about 85 percent of retail sales volume in the county. Its population exceeds the combined population of Montrose County and San Miguel County, which contain the string of small communities in the San Miguel Basin in Colorado that are highly dependent on uranium mining for their economic welfare. Table II shows population trends in the major cities and towns of this area and in Rifle (Garfield County) located to the northeast of Grand Junction. Total population of what is called the San Miguel Basin has been estimated at about 7,000, which is considerably more than the combined population of the communities listed in the table footnote.

"The region's economic dependence on the uranium mining industry can be illustrated by looking at the importance to the region of the Union Carbide Corporation operations alone. This corporation spends an estimated $20 million (exclusive of income taxes) a year in Colorado, of which about $16.8 million is spent in Colorado West (i.e., 21 counties in western Colorado). The company's payroll alone amounts to $6.5 million a year. In addition, the company pays about $4.0 million a year for hauling and for the services of its mining contractors, $1.2 million for power and gas, $931,000 for rail and truck transportation (inside and outside the region), and about $700,000 in local taxes (mostly property taxes).

"Union Carbide presently employs about 770 people, of whom 30 are employed in mines near Rifle, 295 are miners in the Uravan Belt area, about 40 to 100 miles south of Grand Junction. About 100 are staff employees in

TABLE II

POPULATION TRENDS IN MAJOR COLORADO CITIES AND TOWNS[1] DEPENDENT ON URANIUM MINING AND MILLING

Total Population, January 1	City or Town/Country			
	Grand Junction, Mesa	Naturita, Montrose	Nucla, Montrose	Rifle, Garfield
1960	18,694	979	906	2,135
1961	19,213	1,020	940	2,110
1962	20,241	1,070	950	2,150
1963	20,500	1,110	925	2,175
1964	21,000	1,050	850	2,150
1965	22,400	1,000	850	2,200
1966	22,550	950	800	2,400
1967	22,735	971	900	2,400
1968	22,750	979	900	2,400
1969	22,750	979	900	2,400

Notes: 1. Data for Paradox, Redvale, and Uravan in Montrose County not available; current population estimates for them are given below. Figures for 1970 were estimated during field work.

In Montrose County	Estimated Population	Year
Uravan	800	1970
Redvale	Not available, very small	
Paradox	200	1970

Source: Colorado State Planning Office (April 1969), unpublished tables.

Grand Junction, and 245 are employees in the company's Rifle and Uravan mills. In addition, about 35 contractors to Union Carbide employ about 250 miners, each contractor's employees ranging from 1-2 to about 50. These 35 contractors supply about one-half of total ore shipments to the company's Rifle and Uravan mills. In addition, another 25 percent of total ore shipments to the Rifle and Uravan mills comes from independent operators.

"About 85 Navajo Indians are employed in the Uravan Belt area mines, of whom about 64 are employed in Union Carbide mines. Of these, about 50 are employed in one mine near Dove Creek. Also employed in Union Carbide mines are about 38 employees of Mexican origin."

2. Denver Research Institute Study /12/

As described in the report the San Miguel Basin includes all of San Miguel County and about the southwestern half of Montrose County. (See Figures 1. and 2.) The conditions cited in the Institute's report on the Basin are reasonably representative of the rest of the Uravan Mineral Belt as well. The information given below is derived from this report which includes a detailed analysis of the Basin's economy as well as its potential for further development. The report was released in April of 1971.

Seventy-five percent of the Basin's economy in 1970 was derived from mining, while 15% was from agriculture and stock raising. The remaining 10% is spread among other sectors, tourism presently accounting for only 3-4%.

"Other highlights of the San Miguel Basin's economy are:

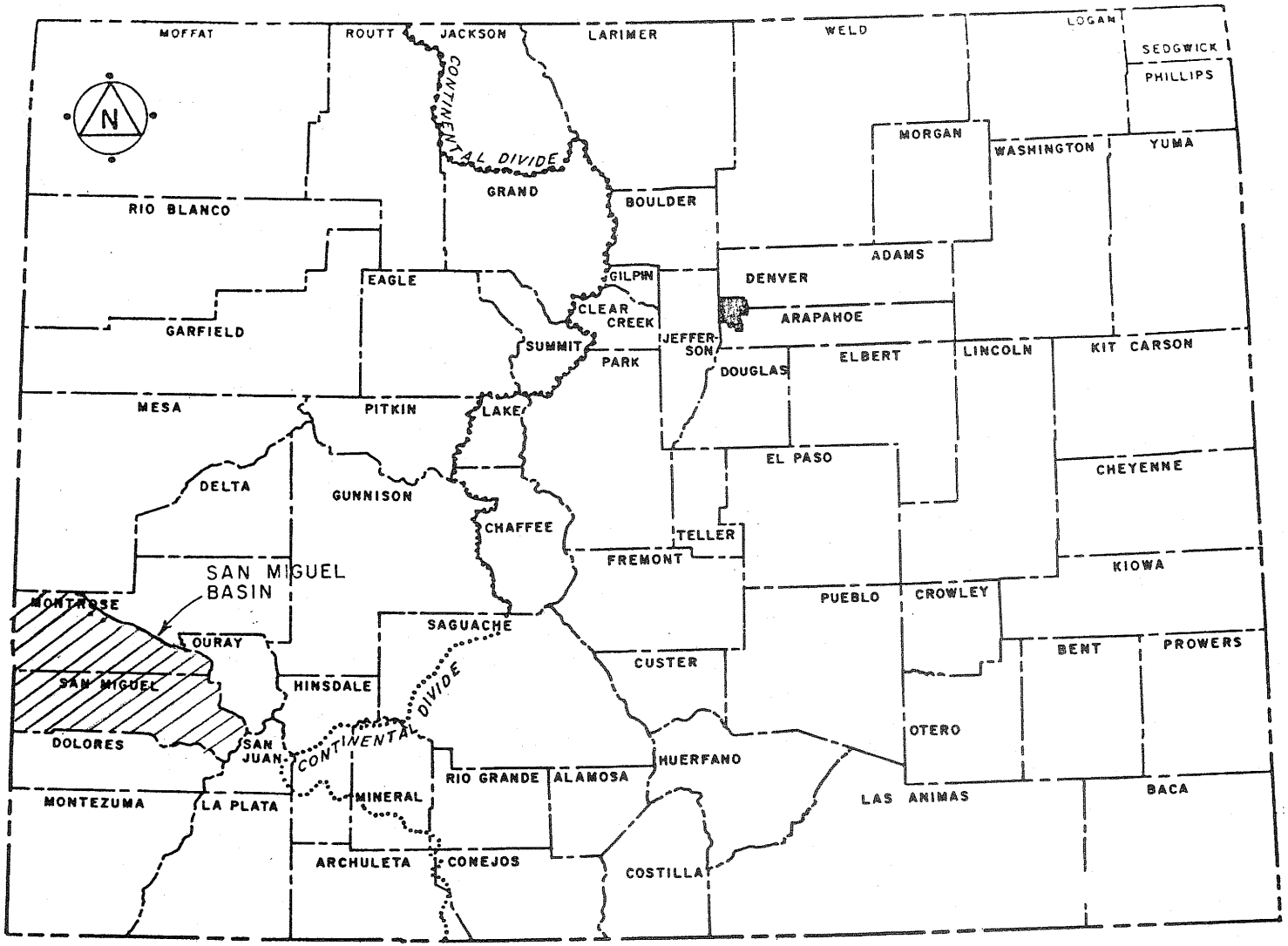

Figure 1. Colorado and the San Miguel Basin

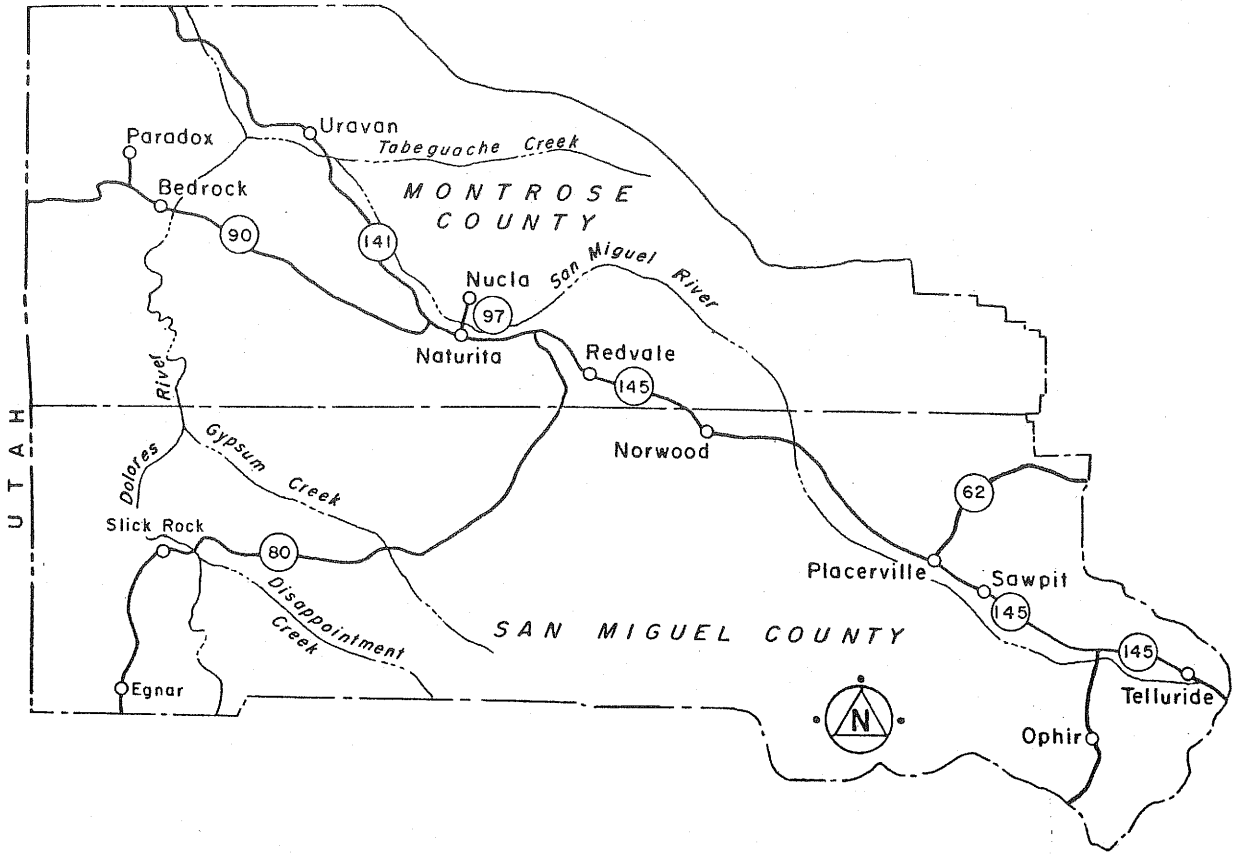

Figure 2. The San Miguel Basin

- Basin population is presently 5,500, a decline of thirty-five percent in the period 1960-1970.
- Basin population density per square mile is 2.1 persons compared to 21.2 persons for the State of Colorado.
- Basin personal income is estimated at $13 to $14 million.
- Basin employment is estimated at 1500-1700.
- Basin retail sales are estimated at $8 to $9 million.
- Basin tax base for ad valorem taxes was $18.8 million in 1969.

Table III provides data on the principal sources of income in the San Miguel Basin.

"This current level of economic activity represents a decline from years past; there was more activity in the late 1950's and early 1960's. The decline now appears to have leveled off.

"From our examination of prospects in each of the nine sectors of the economy it is estimated that activity will stay at about the present level indefinitely, barring a major external stimulus.

"One such major change would be exhaustion of the uranium reserves available to the Uravan mill to the point where it would cease operations. This is a possibility within the next 2 to 5 years, and would seriously damage the Basin economy."

According to the study, the future of the San Miguel Reclamation Project is uncertain. If development occurs it will be sometime after 1980. It would create 5-10 basic jobs in recreation, an estimated 200 basic jobs in agriculture, commencing after completion of the project (estimated 1985-1990), and 200 during a 10 year construction period.

TABLE III BASIC AND LOCAL SERVICE ECONOMY ACTIVITY
IN THE SAN MIGUEL BASIN--FALL, 1970

	(1) San Miguel Basin Total Employment 1970	(2) San Miguel Basin Basic Employment	(3) San Miguel Basin Local Service Employment	(4) Average Personal Income (annual $)	(5) (2×4) Basic Income	(6) (3 × 4) Local Service Income	(7) (1×4) Total Wages and Salary Income and Other Income
Agriculture	180	130	50	$ 6,000	$ 780,000	$ 300,000	$ 1,080,000
Mining	661	643	18	8,800	5,658,400	158,400	5,816,800
Construction	30		30	6,500 (low, utility dominated)		195,000	195,000
Manufacturing	30	25	5	6,500 (logging)	162,500	32,500	195,000
Transportation and Utilities	56	13	43	6,250	81,250	268,750	350,000
Wholesale and Retail	231	14	217	5,500 (many clerks)	77,000	1,193,500	1,270,500
Finance and Real Estate	18	1	17	5,500	5,500	93,500	99,000
Services (including professional)	128	20	108	4,000	80,000	432,000	512,000
Government	225	30	195	7,500	225,000	1,462,500	1,687,500
Total	1,559	876	683		$7,069,650	$4,136,150	
Property Income and Net Transfer Payments[a]					12 percent of Employment Income		$ 1,400,000
Total							$12,605,800

Note: (a) The majority of property income is attributable to agricultural activity.

Source: Field Work.

The following data on mineral values from the San Miguel Basin for 1969 indicates the dominance of uranium and vanadium in the mineral production of the area. Approximately the same ratios existed during the prior 5 years.

	Value of Mineral Production	% of Total
Base & Precious Metals	$ 9,200,000	26.7
Uranium & Vanadium	23,800,000	69.2
Others (including mineral fuels and industrial minerals)	1,400,000	4.1
Total	$34,400,000	100.0

Table IV indicates that during the 1960's, mineral industry activities provided about half the assessed valuation for tax purposes.

3. Information Obtained by AEC on Employment and Community Facilities

The table on page 14 shows the numbers of persons employed, as determined by a survey made by AEC in the fall of each of the years 1967-70.

Availability of Community Facilities - As a result of the sharp decline in population of the San Miguel Basin from 1960 to 1970, town sewer and water systems are capable of serving much greater populations than the current number of residents. Installed electric generating capability of the San Miguel Power Company's Nucla plant is well in excess of current demand, and able to supply a large increase in population. Area school enrollment has dropped 15% since 1963, and could readily accept a greater number of pupils.

There are relatively few empty private houses in the area, as the people who have left the area resided largely in trailers. Even now about 60% of the families in Gateway live in trailers. There are trailer parks in all of the towns over the area with ample space available for more trailers. It is

TABLE IV: IMPORTANCE OF MINERAL TAX REVENUES TO THE BASIN'S ECONOMY

Year	Total Mineral Assessment	Total Assessment	Mineral Assessment as a Percentage of Total
1960	$10,804,175	$21,779,780	49
1961	11,070,185	21,446,345	51
1962	11,201,075	21,753,545	51
1963	10,445,640	21,206,300	49
1964	9,022,175	19,462,405	46
1965	9,399,310	19,263,675	48
1966	10,706,150	19,230,020	55
1967	10,229,620	19,761,685	51
1968	8,765,410	18,385,715	47
1969	9,544,080	19,245,950	49

Source: San Miguel and Montrose County Assessors' Records

Table V indicates population trends:

TABLE V

POPULATION OF SAN MIGUEL AND MONTROSE COUNTIES AND THE SAN MIGUEL BASIN; 1920-1970

Year	San Miguel County	Montrose County	San Miguel Basin
1920	5,281	11,852	N/A
1930	2,184	11,742	3,428
1940	3,664	15,418	6,396
1950	2,693	15,220	5,487
1960	2,944	18,286	8,419
1970	1,949	18,366	5,909

Sources: U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population: 1920, 1930, 1940, 1950, 1960; General Population Characteristics, Colorado. (Washington, D.C.: Government Printing Office, 1921, 1931, 1941, 1951, 1961), 5 vols.

U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population; Colorado, Advance report (Washington: 1971).

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The type and density of recreational usage in the general area are indicated by the data in Table VI

TABLE VI

RECREATION AND TOURISM DATA

RECREATIONAL ACTIVITY IN NORWOOD DISTRICT,*
UNCOMPAHGRE NATIONAL FOREST,
IN VISITOR DAYS, 1966-1969

Type of Activity	Visitor Days			
	1966	1967	1968	1969
Viewing outstanding scenery	700	2,600	2,600	400
Enjoying unusual environment	400	800	1,000	300
Automobile touring	4,500	9,000	20,600	11,600
Motorcycle/scooter touring	N/A	N/A	600	2,900
Ice/snow craft touring	700	700	1,200	3,600
Hiking or walking	900	500	1,000	5,800
Horseback riding	500	500	900	1,000
Rowboating or canoeing	N/A	N/A	100	100
Fishing, cold water	5,100	6,000	6,800	5,600
Camping, general	100[a]	3,000	3,800	3,200
Camping, trailer	2,300	4,500	4,900	5,500
Camping, tent	2,200	6,000	4,700	10,000
Picnicking	1,800	600	800	2,300
Skiing	300	100	100	N/A
Hunting big game	13,700	10,400	9,900	22,100
Hunting small game	400	500	500	800
Hunting upland birds	500	1,300	800	2,500
Nature study	100	100	100	N/A
Mountain climbing	200	900	900	100
Acquiring general knowledge	200	1,300	1,300	N/A
Tours, guided (jeeps)	500	3,600	8,700	3,000
Tours, unguided	N/A	N/A	4,800	3,000
Totals	35,100	52,400	76,100	83,800

N/A = Not available

[a] Automobile

* The Norwood District roughly corresponds to the San Miguel Basin study area and contains 248,887 acres of National Forest land, 148,891 acres in San Miguel County and 99,996 acres in Montrose County.

Source: U.S. Forest Service, Delta, Colorado

apparent that local communities in the area could readily absorb and would benefit from some increase in current population levels.

It is not expected, however, that the leasing of the AEC-controlled lands will cause any substantial increase in the level of employment in the area. It is more likely to provide the means for continuing uranium mining employment at about current levels.

AEC DATA ON

EMPLOYMENT IN
URANIUM-VANADIUM PRODUCTION IN THE URAVAN
MINERAL BELT

	Status about October of:			
	1967	1968	1969	1970
Mining				
Underground Miners	910	611	686	466
Service	18	33	31	20
Support	92	160	132	100
Open Pit Miners	0	0	0	6
Technical	90	47	40	38
Office	23	52	48	40
Supervision	119	87	88	76
Subtotal	1,252	990	1,025	746
Milling	529	515	521	394
Exploration				
Geologists, Prospectors & Engineers	35	38	40	28
Drill Crews	70	65	83	72
Logging Crews & Support	10	12	8	10
Non-technical prospectors	18	24	28	22
Others - Surveyors, Land Men, etc.	52	55	60	48
	185	194	219	180
Total	1,966	1,699	1,765	1,320

Data supplied by Union Carbide Corporation.

The AEC obtained from Union Carbide Corporation in November 1971, updated figures on its operation in the Uravan Mineral Belt, indicating increased expenditures and employment in 1970 over 1969. The data in the A. D. Little report applies for the most part to 1969 and earlier years.

The data for 1969 and 1970 are as follows:

Contributions to Economy of Colorado
Union Carbide Corporation - Mining and Metals Division
Union Carbide Exploration Corporation

	1969	1970
TOTAL EXPENDITURES IN COLORADO	19,800,000	24,900,000
Average number of Company Employees	840	905
Salaries and wages to Company Employees	7,377,000	8,634,000
Number of Independent Mining Contractors	35	29
Average number employed by Mining Contractors	250	281
Amounts paid to Mining Contractors and Hauling Contractors	3,978,000	4,356,000
Payments for rail and truck transportation other than ore hauling	931,000	1,109,000
Purchases of electric power and gas	1,252,000	1,278,000
Property and other taxes except income taxes	700,000	747,000

APPENDIX E

REFERENCES

1. Arthur D. Little, Inc. Report to Federal Radiation Council, September 1970, "An Assessment of the Economic Effects of Radiation Exposure Standards for Uranium Miners." Pages 86-89. GSA Contract GS-03S-33584.

2. Denver Research Institute/University of Denver, "Alternative Economic Development Programs for the San Miguel Basin," a Four Corners Regional Commission Technical Assistance Project, April 1971.

3. U. S. Department of the Interior/Bureau of Sport Fisheries and Wildlife, "Rare and Endangered Fish and Wildlife of the United States," Sheet M-2: January 1966.

4. Environmental Protection Agency, Title 40 - Protection of Environment. Federal Register Vol. 36, No. 228, Thursday, November 25, 1971, Pages 22369 et seq.

5. Colorado Department of Health, Water Pollution Control Commission, "Water Quality Standards and Stream Classification," adopted April 13, 1971, effective September 1, 1971.

6. Colorado Department of Health, Water Pollution Control Commission, "Guidelines for Control of Water Pollution from Mine Drainage," adopted November 10, 1970.

7. New Mexico Water Quality Act, Chapter 190, Laws of 1967, and Regulations adopted thereunder through August 27, 1971.

8. State of Utah, Code of Waste Disposal Regulations, as amended.

9. (Reproduced by the Colorado Department of Health) Chapter 66, Article 31, Air Pollution Control (Air Pollution Control Act of 1970).

10. State of Colorado, "Notice of Publication of Emission Control Regulations for Particulates, Smoke, and Sulfur Oxides," January 14, 1971, Regulation No. 1.

11. State of New Mexico Environmental Improvement Agency, "Ambient Air Quality Standards and Air Quality Control Regulations," January 23, 1970, as amended.

12. State of Utah, Code of Air Quality Regulations, as amended.

13. Colorado Bureau of Mines, "Colorado Mining Laws with Safety and Health Rules and Regulations, Bulletin 20", January 1, 1971.

14. The State Inspector of Mines, Albuquerque, New Mexico, "New Mexico Mine Safety Code for All Mines Including Open-Cut and Open-Pit", 1968.

15. Industrial Commission of Utah, "General Safety Orders Covering Metal and Nonmetallic Mines, Mills, Smelters, Tunnels, Quarries, Gravel Pits, Etc. in the State of Utah", effective July 1, 1963.

16. Industrial Commission of Utah, "General Safety Orders Covering Utah Industries", effective March 1, 1969.

17. 10 CFR Part 20 Standards for Protection Against Radiation. U. S. Atomic Energy Commission, Washington, D. C. 20545.

18. U. S. Public Health Service, "Estimating Human Radiation Exposure on the Animas River", by E. C. Tsivoglou, S. D. Shearer, Jr., J. D. Jones, and D. A. Clark. A paper presented at the Annual Meeting, Bal Harbour, Florida on May 19, 1960.

19. Hearings on "The Problem of Radioactive Water Pollution in the Colorado River Basin", before the Subcommittee on Air and Water Pollution of the Committee on Public Works, United States Senate, May 6, 1966.

20. U. S. Department of Health, Education and Welfare, Public Health Service, Region VIII, "PR-2 Stream Surveys in Vicinity of Uranium Mills I. Area of Grand Junction, Colorado - August 1960".

21. U. S. Department of Health, Education and Welfare. Public Health Service, Region VIII, "PR-3, Stream Surveys in Vicinity of Uranium Mills II. Area of Moab, Utah - August 1960."

22. D. T. Wruble, S. D. Shearer, D. E. Rushing, and C. E. Sponagle, "Radioactivity in Waters and Sediments of the Colorado River Basin, 1950-1963". Radiological Health Data, November 1964.

23. U. S. Department of the Interior, Federal Water Pollution Control Administration, "Radium Monitoring Network Data Release No. 16, January 1970".

24. Siek, Robert D., Colorado Department of Health. Statement before the Subcommittee on Raw Materials of the Joint Committee on Atomic Energy regarding the Use of Uranium Mill Tailings Material for Construction in Grand Junction, Colorado, Thursday, October 28, 1971.

Appendix F

LETTERS OF COMMENT ON DRAFT ENVIRONMENTAL STATEMENT AND AEC'S REPLIES

The following letters were received by AEC in response to the request for comments on the draft environmental statement. The AEC's reply follows each letter.

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

MAY 12 1972

Mr. Julius H. Rubin
Assistant General Manager
for Environment and Safety
Atomic Energy Commission
Washington, D.C. 20545

Dear Mr. Rubin:

This is in reply to your letter of March 22, 1972, requesting our review and comments on the draft environmental statement covering Leasing of AEC Controlled Uranium Bearing Lands in Colorado, New Mexico and Utah.

The statement deals very adequately with environmental restoration of existing disturbed areas and proposed new developments.

We believe that the statement would be strengthened by a discussion of the means of monitoring and enforcement of lease stipulations.

Thank you for the opportunity to review and comment on this environmental statement.

Sincerely,

T. C. BYERLY
Coordinator of Environmental
Quality Activities

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. T. C. Byerly
Coordinator of Environmental
Quality Activities
Department of Agriculture
Office of the Secretary
Washington, D. C. 20250

Dear Mr. Byerly:

Thank you for the Department of Agriculture review and comments on the draft environmental statement, Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico.

Enclosed is a copy of the final environmental statement. Modifications have been made to reflect comments on the draft. In response to your suggestion we have added information on the means to be employed for monitoring and enforcement of lease stipulations. This discussion appears in Part VIII of the statement.

Sincerely,

Julius H. Rubin

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosure:
Environmental Statement -
Leasing of AEC Controlled
Uranium Bearing Lands

DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION, CORPS OF ENGINEERS
630 Sansome Street, Room 1216
San Francisco, California 94111

REPLY TO
ATTENTION OF:

SPDPD-R

6 June 1972

Mr. Julius H. Rubin
Assistant General Manager
for Environment and Safety
Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Rubin:

The draft environmental impact statement on the Leasing of AEC Controlled Uranium Bearing Lands in Colorado, Utah and New Mexico has been forwarded to us for review and comment. In accordance with our review procedures, this letter shall serve as the consolidated response of the District Engineer, Sacramento, and the Division Engineer, South Pacific.

The proposed project does not conflict with existing or authorized projects of the Corps of Engineers. However, in keeping with the intent of Executive Order 11296, 10 August 1966, we would like to call your attention to our Flood Plain Management Services Program which is described in the inclosed brochure. Under that program we could, at your request, provide flood hazard information which might be useful in the selection of underground waste dumps, open pit mines, and confinement of tailings, as well as site selection for buildings and other structures.

Thank you for the opportunity to review and comment on this draft environmental impact statement.

Sincerely yours,

David N. Hutchison

DAVID N. HUTCHISON
Colonel, CE
Deputy Division Engineer

1 Incl
As Stated

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Col. David N. Hutchison
Deputy Division Engineer
Department of the Army
South Pacific Division
Corps of Engineers
630 Sansome Street, Room 1216
San Francisco, California 94111

Dear Col. Hutchison:

Thank you for the review and comments of the District Engineer, Sacramento, and the Division Engineer South Pacific, Corps of Engineers, on the draft environmental statement, Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico.

Enclosed is a copy of the final statement. We thank you also for the information provided on the Flood Plain Management Services Program, and will avail ourselves of these services wherever appropriate.

Sincerely,

Julius H. Rubin

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosure:
Environmental Statement -
Leasing of AEC Controlled
Uranium Bearing Lands

THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

May 3, 1972

Mr. Julius H. Rubin
Assistant General Manager
for Environment & Safety
U.S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Rubin:

The draft environmental statement for the "Leasing of AEC Controlled Uranium Bearing Lands in Colorado, New Mexico and Utah," which accompanied your letter of March 22, 1972, has been received by the Department of Commerce for review and comment.

The Department of Commerce has reviewed the draft environmental statement and has the following comments to offer for your consideration.

In general, the statement appears to be relatively well prepared and the environmental effects seem to be minimal. However, one question which may be raised in view of this initiative is whether the AEC might consider shutting down mining operations in other areas consistent with the increase in activity in the above-mentioned areas. Could the richness of the area and the rather minor impact on the environment substitute for the activities in other areas where the environment is disturbed to a greater degree? Consideration might be given to addressing this issue as a separate alternative.

We hope these comments will be of assistance to you in the preparation of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. Sidney R. Galler
Deputy Assistant Secretary for
Environmental Affairs
Office of the Assistant Secretary
of Commerce
Washington, D. C. 20230

Dear Mr. Galler:

Thank you for the Department of Commerce review and comments on the draft environmental statement, Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico.

Enclosed is a copy of the final report. Modifications have been made to reflect comments on the draft.

You ask if AEC might consider shutting down mining operations in other areas consistent with the increase in activity on the AEC controlled lands, in view of the richness of the ores in the area and the rather minor impact on the environment of mining on these lands.

The only uranium bearing lands on which AEC has control of mining are the lands presently proposed for leasing. Except for these lands, nearly all the presently known reserves of uranium are privately controlled. Therefore, private industry decides when to shut down or open up mines in other areas. The encouragement by AEC of continued production from an operating mining district such as the Uravan Mineral Belt in order to mine all economically recoverable ore will have somewhat the same effect as you suggest. It will tend to retard development of higher cost and lower grade resources until needed. The net effect should be to reduce the overall environmental disturbance.

Sincerely,

Julius H. Rubin

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosure:
Environmental Statement -
Leasing of AEC Controlled
Uranium Bearing Lands

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO:

21 APR 1972

Mr. Julius H. Rubin
Assistant General Manager for
Environment and Safety
Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Rubin:

Your letter of March 22, 1972 requests comment on the Draft Environmental Statement covering Leasing of AEC Controlled Uranium Bearing Lands in Colorado, New Mexico and Utah. Federal Power Commission comments on environmental statements relate to those aspects of the proposed actions affecting the adequacy and reliability of electric power.

Although uranium is the fuel for nuclear plants, and the proposed action will increase the supply, the draft statement notes: ". . . the amount of uranium involved is only a small proportion of the U. S. reserves. If the resources in the AEC-controlled lands and nearby areas were not available, uranium production would be increased from other sources. The effect of the leasing program on overall availability of uranium from the viewpoint of the utility industry would be relatively small . . ." We conclude therefore that the proposed action will have no significant effect on the adequacy of electric power.

Very truly yours,

T. A. Phillips
Chief, Bureau of Power

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. T. A. Phillips, Chief
Bureau of Power
Federal Power Commission
Washington, D. C. 20426

Dear Mr. Phillips:

Thank you for the Federal Power Commission review and comments on the draft environmental statement, Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico.

Enclosed is a copy of the final environmental statement. Modifications have been made to reflect comments on the draft.

Sincerely,

Julius H. Rubin

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosure:
Environmental Statement -
Leasing of AEC Controlled
Uranium Bearing Lands

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20201

JUL 13 1972

Mr. Julius H. Rubin
Assistant General Manager
for Environment and Safety
U.S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Rubin:

This is in response to your letter of March 22, 1972, wherein you requested comments on the draft environmental impact statement covering Leasing of AEC Controlled Uranium Bearing Lands in Colorado, New Mexico and Utah.

This Department has reviewed the health aspects of the above project as presented in the documents submitted. There appears to be little adverse impact on general health and welfare of the general public, except for radiological hazard from tailings. The section on controlling this hazard should be expanded by detailing specific actions which will be taken to control this problem.

The opportunity to review the draft environmental impact statement is appreciated.

Sincerely yours,

Merlin K. DuVal, M.D.
Assistant Secretary for
Health and Scientific Affairs

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Merlin K. DuVal, M.D.
Assistant Secretary for Health
and Scientific Affairs
Department of Health, Education,
and Welfare
Washington, D. C. 20201

Dear Dr. DuVal:

Thank you for the Department of Health, Education, and Welfare review and comments on the draft environmental report, Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico.

A copy of the final report is enclosed. As you will note, the section concerning measures for control of radiological hazard from mill tailings has been expanded. The State of Colorado has adopted regulations for control of mill tailings, and the active program resulting from these regulations is more fully described. We consider that the situation is now under control and should remain so.

Sincerely,

Julius H. Rubin

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosure:
Environmental Statement -
Leasing of AEC Controlled
Uranium Bearing Lands

cc: T. E. Moore, DHEW,
Region VIII

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

MAY 23 1972

Dear Mr. Rubin:

In response to your letter of March 22, 1972, we have reviewed the draft environmental statement for the proposed leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, and New Mexico.

Specific comments are attached as an enclosure. General comments on the document as a whole follow:

The draft does not describe the existing environment in sufficient detail so that the reviewer is able to assess the possible impact of the project on the environment. The June 30, 1971, Bureau of Land Management report to AEC went into considerable depth, often on a site by site basis, to relate the existing situation. We feel the Commission could have used this specific information in the draft statement.

The draft statement develops considerable detail on economic impacts. We feel this has been overdone resulting in a "selling," tone in the report. We feel page 5, paragraph 2; page 11, paragraph 2; pages 18-21, and pages 49-51; could all be deleted. The item on page 14, paragraph 3, that equates income or value from livestock grazing with that of the uranium-vanadium industry seems inappropriate. It has no bearing on the environmental quality question, and tends to lessen the reader's interest in assessing the environmental possibilities.

The draft does not raise the question of what, if any, environmental consequences are now resulting from the two uranium mills now in production (Uravan and Rifle). The larger question is, what additional environmental harm, if any, will come from the ore to be shipped to these mills by reason of the AEC leasing program?

In sections of the report concerning the individual property units, more specific data would be helpful. General statements were made concerning future production rates and probable environmental effects, but pertinent data for each property unit, such as established ore reserves, depth of ore, potential for new reserves, extent of probable new exploration, and projected production, in addition to the special stipulations listed in the Appendix, would be of further assistance in assessing environmental significance.

The alternatives subjected to review (pages 3 and 45-46), seem to oversimplify the "Do not lease, and maintain lands in withdrawn status" opportunity. The rationale behind negating this choice seems to be offset by such statements as are found on page 18, paragraph 3: "There is no shortage of uranium in the United States at the present time, . . ." We feel these apparent inconsistencies should be clarified.

The discussion of alternative in the statement would be strengthened by discussing other sources of energy. Fossil fuels are not mentioned but no other power sources are considered. Recent court decisions involving impact statements have stressed the need to consider all reasonable alternative energy sources in any situation related to energy production.

Some tracts or portions of tracts have been eliminated from leasing. The report does not indicate why. This might be explained in the statement, particularly if eliminated for environmental reasons.

Sincerely yours,

Deputy Assistant Secretary of the Interior

Mr. Julius H. Rubin
Assistant General Manager
For Environment and Safety
U.S. Atomic Energy Commission
Washington, D.C. 20545

Enclosure

SPECIFIC COMMENTS

Page 23, Wildlife. We suggest the second and third sentences read as follows: "Three unusual subspecies of mammals of restricted distribution were noted. They are the White-throated woodrat (Neotoma albigula brevicauda) on the mesas east of the Dolores and San Miguel Rivers; the Aberts Squirrel (Sciurus aberti navajo) and the Northern Pocket Gopher (Thomomys talpoides durranti) in the Elk Ridge area of Utah."

Euderma maculata should be underlined.

Page 24, paragraph 1 - "yellow pine" and "pinon" should read "Ponderosa pine and pinon pine."

Page 33, III Environmental Impact. Land uses for livestock, wildlife, recreation, history, archeology, soil and watershed, forestry, oil and gas, and water are discussed in general terms under II.C.1., characterization of the existing environment. The impacts of the proposed action on each of the above land uses should be discussed in detail under Section III on Environmental Impact.

Because the format of the report also proposes to discuss the proposed control method under the Environmental Impact heading, the specific measures to minimize the impacts should also be defined here. The statement that AEC and BLM entered into a Memorandum of Agreement calling for BLM to make a surface protection examination and formulate stipulations to protect the surface resources and reclaim the lands on AEC withdrawn lands is insufficient information upon which to evaluate proposed methods to control the adverse impacts.

Page 34, paragraph 4, the reference to air and water quality should be expanded to say that "The leases will require adherence to applicable Federal and State regulations on environmental quality . . ."

Page 38, Water Quality. The situation which will be created which will have an impact on water quality is not adequately described. Possible adverse impacts to water quality should be thoroughly explored and the alternatives to maintain water quality control should be assessed.

Page 39, 4. Secondary Effects. The waste products of the milling operations are in the form of liquid effluents resulting from dissoluation of metal values from the ore, and finely ground solid tailings. The tailings contain 85 percent of the radioactivity originally in the ore and they must be permanently impounded. The implication is that impounding is necessary to prevent erosion by water. There is no mention of the effects of wind erosion on the impounded tailings.

Required inspection, labeling, and--if warranted--posting of mine wastes containing or producing residual and concentratable radioactive materials, e.g., radon, should probably also be considered. The suggested measures, covering and seeding of mine wastes, or other ultimate containment, should be stipulated in leases.

Page 43, A. Excavations. The statement briefly mentions safeguards to prevent surface runoff water entering the mines and that mine entrances will be sealed upon termination of the lease. The statement does not discuss depths or structural soundness of geological formations from which deposits will be mined. More discussion of this aspect might be included in the report to evaluate future and long term possibilities of surface subsidence over the mined areas.

Page 47, paragraph 3. The extensive reports prepared by the BLM team members related the variety of long term productive uses in the areas. To say their utility or potential is "very limited" is misleading. When specaking of livestock grazing, recreation, wildlife, and other amenities, these are all renewable values and certainly do have an expansive utility or potential. We suggest this reference be deleted.

Page 52, paragraph 2 through page 54. This appears to be repetitious of information found in earlier parts of the report. We suggest this could be eliminated.

Page 62. The description of tract Utah E-4 is in error. The correct township is 36 South rather than 38 South.

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. William W. Lyons
Deputy Assistant Secretary
Department of the Interior
Washington, D. C. 20240

Dear Mr. Lyons:

Thank you for the Department of the Interior's review and comments on the draft environmental statement - Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico.

A copy of the final report is enclosed. Modifications have been made to take into account comments received on the draft.

The specific comments from the Department of the Interior are discussed in the enclosure to this letter.

Sincerely,

Julius H. Rubin

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosures:
1. Environmental Statement - Leasing of AEC Controlled Uranium Bearing Lands
2. Discussion of comments made by the Department of the Interior on the draft statement

Description of the Environment

The Bureau of Land Management (BLM) report served as the basic environmental study from which much of the information in the statement was derived. Since the report is available from the USAEC Grand Junction Office, and is on file in the County libraries of all counties in which the lands are located (see page 34 of the report), inclusion of the considerable amount of information from the BLM report was not necessary.

Economic Impacts

A balanced assessment of the consequences of the leasing program is a necessary part of the environmental statement. While it is not the AEC's intention to do a selling job in the report, failure to mention anticipated economic benefits and the need to conserve valuable resources, factors which have a definite bearing on the decision making process would also be undesirable. We believe the suggested deletions would be undesirable, as they would remove information which has been pertinent in evaluation of the program.

We compared the income derived from mining with that from grazing which is the next most important income producing activity on these lands. The possibility that mining activity could

adversely affect other economic uses of the lands, and the comparative importance of these activities is considered a desirable point to examine in connection with the assessment of environmental impact.

Environmental Effects of Milling Operations

Under the subject of "Secondary Effects - Uranium Ore Processing" the adverse effects which have been observed in the past as a result of uranium milling operations are discussed. Additional information on control of tailings has been included in the final report. Although many studies have been made of the waters of the Colorado River Basin, no significant adverse effects have been attributed to recent operations at Rifle and Uravan, nor are any other significant environmental consequences known to be resulting. There is no reason to believe that any additional environmental harm will result from milling ores by reason of the AEC leasing program.

Property Units

General information has been presented in the report which is considered pertinent to the proposed leasing action on the entire group of properties, and the probable environmental effects. Further information on the specific lands is contained in the BLM report. Most of the units will require further

exploration work before mining plans can be developed. A large amount of information on past exploration and mining is on open file in the Grand Junction Office. In view of the variability in the data, and since the properties are to be offered for competitive bidding, AEC believes each interested party should make its own economic evaluation. If such information were to be included in the report, it would tend to amplify the selling tone which Interior has already suggested has been overemphasized.

No-Lease Alternatives

Further information has been provided in the final report on the supply-demand relationship in response to this suggestion and similar comments from others. The situation as described is factual and not inconsistent as might appear at first. Basically, up until about 1966 there was essentially no commercial market for uranium. The U.S. Government purchased almost all the uranium produced in the U.S. and most of that produced overseas to meet its own requirements. Government domestic purchases reached a peak of about 17,000 tons in 1961, declined gradually to about 7,000 tons in 1969, and ended at the end of calendar year 1970. Commercial requirements are increasing rapidly as nuclear power plants are built, but a temporary period exists in which requirements are not yet in balance with

production capacity. Hence, there is presently an oversupply of uranium. This situation will not last long, and in a few years demand will substantially exceed existing mill capacity. New mines on most of the AEC lands cannot be started up without further exploration and development, and as is mentioned in the environmental statement (page 18) a lead time of 3 to 5 years is needed before the AEC lands can be expected to reach full production. The time to begin leasing appears to be at hand.

Other Energy Alternatives

Additional information has been included in the statement, as noted above on the supply-demand situation for uranium as a nuclear power source. A full discussion of all other energy sources does not appear to be warranted or even desirable in connection with the proposed leasing program. It would imply that in the event AEC failed to lease its properties, the utilities would, therefore, have to seriously consider alternatives to nuclear power plants for generation of electric energy. Such is very unlikely. The estimated reserves of uranium ore on the AEC lands contain about 3,000 tons U_3O_8, although the potential for further discoveries is good. However, the reserves in the U.S. controlled by private

companies were 270,000 tons as of January 1, 1972. Reserves are increasing at the rate of about 30-40,000 tons per year in spite of production of 12-13,000 tons per year. In these circumstances the reserves on the AEC lands are not large enough to be a factor in consideration of alternative types of energy sources. The likely results if the AEC lands were not leased are that production in the Uravan Mineral Belt would cease before the developed resources of the area had been produced, and new uranium mines would be developed in other areas somewhat sooner than would otherwise be necessary. The probability is that the environmental impact would be greater than from renewed mining on the AEC controlled lands. As is pointed out in the discussion of alternatives in the report, to withhold the AEC lands would reduce overall recovery of valuable resources of uranium and vanadium in the area. In view of the large long range need for these materials, such a policy would be wasteful.

Elimination of Tracts

The tracts and portions of tracts which have been eliminated from the areas to be offered for leasing have been set aside for environmental purposes, and resulted largely from the

studies performed by BLM. In some instances, rather than place special stipulations on conduct of exploration and mining in certain areas, AEC elected to remove these areas from the lease blocks, and thereby eliminate their use entirely by the lessee.

Specific Comments

Changes have been made to take into account the specific comments wherever appropriate. Some of the suggestions will be accomodated through exploration and mining plans prepared by each lessee to which AEC may add necessary conditons. The anticipated effects of mining on other land uses are discussed in the Cost-Benefit Analysis, and under Relationship Between Short Term Uses and Long Term Productivity.

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
SUITE 900, 1860 LINCOLN STREET
DENVER, COLORADO 80203

June 29, 1972

Mr. Julius H. Rubin
Assistant General Manager
of Environmental Safety
U. S. Atomic Energy Commission
Washington, D.C. 20545

Dear Mr. Rubin:

The Environmental Protection Agency has reviewed the Draft Environmental Statement, "Leasing of AEC Controlled Uranium Bearing Lands." We regret the delay in forwarding our reply.

The Draft Statement contains insufficient information to allow a complete evaluation of the impact of the proposed leasing program on the total environment of the Uravan Mineral Belt and other involved areas.

The Draft Statement gives evidence of early and commendable coordination of the project with the Bureau of Land Management and Forest Service and indicates the AEC is basically committed to follow the recommendations and stipulations developed by the multi-disciplined team of experts on the use of land and its resources.

We note that at the time the EIS was written, AEC had yet to establish the detailed provisions of the lease program to be incorporated in the terms of the lease agreements and in bid invitations. Inasmuch as each lease will contain provisions for protection of the environment, our EPA Region VIII Office should review the terms of such leases in order to be fully informed of the stipulations defining the lessees' responsibilities in this regard.

The Draft EIS states, "the leases will also require approval by AEC of exploration and mining plans of each lessee to assure that provisions for environmental protection are adequate." Since these plans will undergo review prior to consummation of the leases, it is recommended that EPA's Region VIII Office be furnished copies of the plans for study and comment.

The Draft EIS does not make clear the responsible "surface management agency" for each tract proposed for leasing. EPA, therefore, requests that the Final Statement define not only which agency is to be the surface manager for a given tract, but also outline the responsibilities of this manager.

The proposed new leasing program stimulated comments reflecting deep concern within EPA on several environmental consequences which include the continuing large scale problem of control of radioactive waste material produced by uranium mines and especially by mills which process the ore. Both our agencies and also the general public are aware of widespread publicity and anxiety which misplaced radioactive mill tailings have generated in the past and which must be prevented in the future.

On that point the Draft EIS is insufficient. Pages 39-42 describe as secondary effects the milling of uranium ore. Regulatory control of milling operations under AEC licenses is mentioned and it is predicted (on page 42) that states can be expected to exert much tighter control over any removal of tailings from mill sites in the future. We urge the inclusion of a much stronger statement on the part of AEC to reflect, or perhaps to reiterate, its firm policy to take appropriate measures--by stipulation, assistance to the states, or otherwise--to minimize any public exposure to increased radioactivity resulting from mine or mill waste products generated by the renewed leasing program.

We appreciate the opportunity to review this statement and we will be pleased to answer any questions about our comments.

Sincerely yours,

John A. Green
Regional Administrator

Enclosure

ENVIRONMENTAL PROTECTION AGENCY

COMMENTS ON DRAFT ENVIRONMENTAL STATEMENT FOR LEASING OF AEC CONTROLLED URANIUM BEARING LAND - COLORADO, UTAH, NEW MEXICO (AEC DOCUMENT WASH - 1523)

SUMMARY OF MAIN CONCLUSIONS

The draft environmental statement illustrates a substantial effort on the part of the AEC to address the circumstances, i.e., environmental and economical, surrounding the proposed leasing of AEC held uranium bearing lands. The Environmental Protection Agency (EPA), however, needs additional information to comprehensively evaluate the environmental impact of this leasing project. Primary concern on the part of the EPA stems from three areas: 1) the coordination of this uranium leasing project with the overall resource planning efforts done by the BLM. 2) the controls and stipulations to be written into lease agreements, and 3) the milling and attendant waste products of ore mined from the land covered by these leases.

The draft environmental statement neglects to mention the resource planning already done by the BLM. The Unit Research Analysis - Management Framework Planning (URA-MFP) data generated by BLM should be considered in the final statement. These data, if not already considered, should be used to show how the uranium industry may be coordinated with other resources such as timber, soil game watershed, and minerals other than uranium.

The draft statement does not give a complete list of stipulations, recommendations, and controls to be placed on individual mining units. Instead, page 12 of the statement indicates that the AEC has "...yet to establish the detailed provisions of the lease program..." Attempting to evaluate the environmental impact of work being controlled by stipulations

which are not clarified is impossible. The final statement, then, should include all stipulations, controls, and/or recommendations listed by the lease tract to which they pertain in order that a complete and comprehensive evaluation of environmental impact can be made. As an alternative to listing the leases in the final statement, they could be transmitted to the EPA Region VIII office for evaluation and comment prior to release for bids. Stipulation 25 on page 103 of the draft statement requires submission of detailed mining plans. These plans should also be transmitted to the EPA Region VIII office for information and possible comment. In addition to the above requests, it is necessary that the final statement indicate what agency will have the responsibility of land manager for each lease and under what authority the stipulations, recommendations, and controls will be enforced.

Finally, EPA's major concern stems from steadily growing amounts of radioactive waste materials resulting from the milling of uranium ore. The draft statement indicates that the mills in the Uravan Mineral Belt area are Union Carbide's Uravan and Rifle mills and the Atlas Mill at Moab, Utah. In addition to these facilities, the Rio Algom concentrator plant is presently being completed in the Moab, Utah area.

The ore involved in this leasing project is primarily a carnotite uranium-vanadium complex which can presently be handled economically at the Rifle and Uravan mills only because of a fire in the vanadium facilities at the Moab mill. However, recent information released by Union Carbide indicates that all mining and milling operations at the Rifle, Colorado

site will cease as of August 1, 1972. In addition, the Union Carbide Uravan Mill is installing additional vanadium capabilities. These trends indicate that, at the time of leasing, the only active mill capable of processing the ore from the leases in question will be the Uravan Mill which has a stated capacity of 1,000 tons per day. The EPA would like to see many improvements in the Uravan operation if it is to be utilized in milling of the ore in question for the next 5 to 20 years, instead of closing in 2 to 5 years as predicted on page 21 of the draft statement. Improvements would involve 1) stabilization of existing tailings, 2) lining of ponds, 3) installation of spill prevention facilities, 4) improvement of process plant facilities, 5) new domestic waste disposal facilities (e.g., solid waste, oil, etc.), 6) significant reductions in solids discharged, and 7) preparation of plans for the stabilization of tailings as portions of the developing pile become inactive.

Detailed comments keyed to specific areas of interest are as follows:

STIPULATIONS, RECOMMENDATIONS, AND CONTROLS

According to page 34 of the draft environmental statement, "It was the judgment of the multi-disciplined team that examined the lands ... that surface values and sound multi-use management practices can be maintained if the recommendations and stipulations as set out in the report (Appendix C) were adhered to." The AEC should give, in the final impact statement, a complete listing of stipulations, recommendations, and other controls to be utilized in enforcement of specific lease agreements for each lease tract in question and/or follow the alternative of releasing this information to EPA Region VIII as given on page 2 of this review.

Page 33 of the draft environmental statement reads "...under the Mining Law of 1872, it (BLM) does not have authority to exert direct control of mining for metals on claims staked on public land." Based on this statement, who will serve as land manager for each lease tract and who will have the responsibility for enforcement of the lease agreement?

Specific BLM stipulations needing clarification in the final statement are numbers 1, 6, 17, and 20.

#1 The rehabilitation compliance bond should be high enough and ensure that the lessee completes his obligation to clean up. The $5,000 figure given on page 108 is quite low for its intended purpose and might simply be forfeited by the lessee if the cost of rehabilitation was projected to be excessive.

#6 Drill holes, excavations, and improvements should be conditioned to prevent injury to water resources as well as persons, livestock, and wildlife.

#17 This stipulation should not require the lessee to pay for archaeological surveys and salvage operations on the land covered by his lease. This could be very expensive making it very difficult for a lessee to willfully report all archaeological finds. The lessee will be set back sufficiently by lost time while detailed surveys and salvage operations are undertaken on discoveries which may be made.

#20 What are "... acceptable State and Federal disposal methods ...?"

MINING AND SURFACE MANAGEMENT

The mining of ore through old uranium mine workings or entry through existing mines on adjacent ground, as indicated on page 19, B-4 of the draft environmental statement, may be difficult in light of the annual exposure standard of four working level months (WLM) published by the EPA as guidance for underground uranium miners. Many of the existing workings have not been mined since the 1962 shutdown. The final impact

statement should recognize that steps must be taken to assure that this 4 WLM exposure standard is not exceeded.

The semi-arid conditions alluded to on page 43 do not always insure dry mine workings. Such a conclusion can be based only on experience which is not documented. At least one case in point, the Refuse Act Permit Application for dewatering of the Union Carbide Garfield Mine, shows an estimated dewatering flow rate of 100,000 gallons per day. As indicated on page 38 of the draft statement, if water discharge becomes necessary, checking will be required to assure that liquid releases meet applicable standards. The final statement should indicate who will be responsible for this checking, as well as what standards are applicable.

In addition to water quantity, page 16 of the draft statement does not adequately address the quality of water that can be discharged from mines. The Garfield mine, as mentioned above, showed significant concentrations of Ra-226 in its discharges. The final statement should consider both the quantity as well as the constituent quality of mine drainage. Consideration should also be made of the treatment of mine drainage as well as domestic wastes at the mine sites.

The AEC should include EPA Region VIII in the review of the mining plan, which should incorporate revegetation, return-to-the-mine, or other measures to achieve restoration.

MILLING

Page 16 of the draft environmental statement reads, "Outside of the disturbance of the surface in the course of exploration and mining, and

the adverse effects of abandonment of some mines without proper protection and cleanup, there have been no permanent adverse effects on the ecology of the Uravan Mineral Belt area that have been identified. On the other hand, surface disturbance has been widespread, and it affects scenic values." This statement should be modified to note the possible adverse effects of past uranium milling operations in the Uravan Mineral Belt. Waste tailings resulting from uranium milling are present throughout the Uravan Mineral Belt. They are permanent considering the 1620 year halflife of radium-226, and therefore are a long-term hazard to the environment as well as the public health of the area in question.

Waste material from mining and milling must be effectively controlled to minimize the short and long-term detriments to the environment. The AEC should, in the final environmental statement, address the control of mill wastes more directly. Consideration should be given to the tailings as well as the acid liquors for operating mills. Considering the states' responsibility for such control, the AEC should continue to work directly with EPA and state governmental entities to influence the passage of regulatory measures to insure the perpetual control of milling wastes at inactive mill sites. Model Regulations have been drawn up by the EPA Region VIII Office which deal with the tailings problem at inactive mill sites as alluded to on page 41 of the draft statement.

Of the three states in question, only the State of Colorado has regulations in force which govern the stabilization and control of radioactive mill tailings at inactive mill sites. Considering the potential

source of unnecessary radiation exposure for many generations to come, EPA recommends that no AEC or agreement state uranium milling license be terminated until that state in which the mill is located has adopted radioactive tailings control regulations.

If the Uravan Mill is to process most of the ore in question, additional information dealing specifically with the mill is necessary. Although the Uravan Mill is the oldest active uranium milling facility in the United States, it has in the past demonstrated an ability to drastically upgrade the quality of its effluents to meet imposed restrictions. Data submitted by the Uravan Mill to the EPA Region VIII Office in a Refuse Act Permit Application dated June 8, 1971, indicates, however, that large quantities of solids are being released, i.e., 30 tons of total solids, to the San Miguel River per day.

Since the Uravan Mill is expected to process sufficient quantities of ore from the AEC-held leases such that extension of the life of the mill beyond the projected shutdown in 5 years would occur, EPA requests answers to the following questions. It is recognized that these answers can not be supplied in the final impact statement, but should be supplied to EPA within 12 months or prior to the milling of the ore in question, whichever is earlier.

1) What capacity is presently available for tailings disposal and how will the increasing milling of the ore supply from the leases in question effect this available capacity? Presently there are in excess of 5,500,000 tons of uranium tailings covering over 80 acres.

2) What steps are being taken to stabilize the hillside tailings pile at Uravan? Also, what plans are being made to finalize stabilization following mill shutdown?

3) What provisions are being made to control pond seepage and to prevent overflow from all pond facilities, e.g., leaching ponds, evaporation ponds, sediment ponds, and emergency ponds? The Uravan Mill experiences seepage from its Club Ranch, River, and the "New" River Ponds. Seepage to the San Miguel River from the Club Ranch pond was measured in 1969 at a concentration of 320 pCi Radium-226 per liter.

4) What provisions are being planned to prevent future accidental spillage incidents?

5) What facilities are available for treatment of liquid wastes? Efforts need to be in the area of reduction of total dissolved solids and in turn salinity, i.e., SO_4, Cl, and Na, presently being discharged to the biosphere.

6) What will be the aggravation of existing air quality parameters at the mill site resulting from increased availability of ore? A response to this question should include a listing of present emissions (gaseous, particulate, visible, invisible, radioactive and non-radioactive) from the mills, and an estimate of possible increases in these emission levels.

As suggested on page 42 of the draft statement, an alternative to the Uravan milling operation would be the establishment of a new milling facility in the Uravan Mineral Belt to absorb an increased supply of uranium-vanadium ore. A new facility could, by affording up-to-date milling capabilities, decrease the environmental impact of the uranium lands leasing project.

Without sufficient assurance as to the capacity for up-to-date milling operations, either at Uravan or another site, EPA must express reservations as to the "minimal" environmental impact from the leasing of the AEC holdings of uranium bearing lands.

OPEN PIT MINING

All agreements for land to be mined by open pit operations, i.e., NM-B-1 and some Slick Rock units, should contain assurance that proper reclamation and stabilization will take place. A proposed procedure for this reclamation and stabilization follows:

a) overburden will be backfilled into the pit and contoured as stated on page 3 of the draft statement.

b) open pit areas will be revegetated following contouring.

c) contouring and revegetation should follow recommendations of the U. S. Department of Interior publication "Surface Mining and Our Environment."

This proposed program is only one possible solution to the problems resulting from scarring of the surface areas by open pit operations. Consideration of definite reclamation procedures as proposed or otherwise, should be addressed in the final statement.

Additional clarifying information should be included in the final statement concerning the disturbance of only one to two acres of land per open pit operations (page 36 - 3 open pit mines). Does this mean that only two acres of the 320 available in the NM-B-1 unit will be disturbed?

ALTERNATIVES

Pages 3, 4, and 46 of the draft statement briefly dismiss consideration of alternative energy sources. Due to the recent ruling of the Washington, D. C. Circuit Court on January 12, 1972, in the case Natural Resources Defense Council v. Morton, ___F.2nd___, however, the AEC should consider in the final statement a broad range of alternatives and

describe the environmental impacts, both beneficial and adverse, of the various alternatives considered. These alternatives should include information on domestic and foreign sources of U_3O_8 and V_2O_5, such as the Wyoming reserves of both uranium and vanadium.

Additional information should be obtained on alternatives including the economic contributions to the Uravan Mineral Belt of mineral activity in the areas of oil shale, coal-gasification, etc. What is the availability of minerals other than uranium and vanadium and what are the prospects for resource development in the Montrose and San Miguel county areas? This information will be useful in evaluating income and employment in the Uravan Belt and the effect on this income and employment from a decreasing uranium-vanadium industry in the area should this decrease continue with a possible concurrent increase in the development of other resources in the region. Who will be responsible for correction of existing "undesirable conditions" referred to on page 46 of the draft statement if the holdings in question were to remain in a withdrawn status?

GENERAL

1) The final statement for the proposed land leasing action should present a discussion of the need for this uranium ore and the environmental costs and effects accompanying its mining and milling, in relation to the import-export situation of processed uranium.

2) The final statement should include a description of the ultimate dispensation of royalty funds paid to the AEC by the lessees. Are these funds to be applied to rehabilitation of the mined areas or is the lessee solely responsible for

rehabilitation of the lease sites in question, including existing damages from past mining operations?

3) Fugitive dust or chunks of ore from ore transport operations should be controlled. Provisions should be made in the lease stipulations requiring the covering of transport vehicles moving ore from any given lease to a mill site.

4) The Uravan Mineral Belt includes prime Big Game winter range. This interaction between year-round mining operation and big game habitat must be coordinated with the Colorado Game, Fish and Parks, as well as the BLM and Forest Service, as indicated on pages 23 through 30 of the draft statement.

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. John A. Green
Regional Administrator
Environmental Protection Agency
Region VIII
Suite 900, 1860 Lincoln Street
Denver, Colorado 80203

Dear Mr. Green:

Thank you for the Environmental Protection Agency's review and comments on the draft environmental statement - Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico. Modifications have been made to take into consideration comments received on the draft statement. A copy of the final statement is enclosed.

AEC will be pleased to provide to the EPA Region VIII Office for review and comment the environmental protection provisions of the lease documents as soon as they are put in final form. Mining and exploration plans will be drawn up only after leases are awarded and the lessees have had the opportunity to make plans for their operations. We will be glad to furnish copies of the initial plans to EPA Region VIII Office for study and comment. It should be recognized, however, that these plans must be expeditiously handled by AEC, and that they are likely to be subject to frequent modifications as operations progress.

The surface management agency is a matter of record for each tract. The surface management responsibility on unit NM-B-1 in New Mexico rests with the Bureau of Indian Affairs. The tracts on Forest Service lands include U-H-3, and U-CW-4. The AEC has surface management of a limited area covered by patented claims. BLM is the surface management agency for the remainder of the withdrawn areas. However, since AEC will have the administrative responsibility for metal mining activities on its leases, including the right to terminate

leases for failure to comply with lease stipulations, it will have full responsibility for the enforcement of lease conditions, whether or not another agency has surface management interests. Such other agencies will be consulted, however, and their advice sought on the conduct of operations.

The section of the report on the control of radioactive waste materials has been expanded.

A discussion of your detailed comments is enclosed.

Sincerely,

Julius H. Rubin

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosures:
1. Environmental Statement - Leasing of AEC Controlled Uranium Bearing Lands
2. Discussion of comments made by the Environmental Protection Agency on the draft statement

cc: Sheldon Meyers, EPA

Resource Planning by BLM

We are informed by BLM that they used the Unit Resource Analysis - Management Framework Planning information to the extent it was available in connection with the analysis of the leasing program and preparation of the BLM report. Much of this information was summarized in the draft environmental statement under the section on Characterization of the Existing Environment. It is also considered in the section on Cost - Benefit Analysis. In addition, AEC considered the special study on economic development of the San Miguel Basin by the Denver Research Institute (Reference 2)

Identification of Environmental Controls by Lease Units

While the AEC has not yet established all of the detailed provisions of the lease program, the provisions concerning environmental controls are fully covered in the draft environmental statement. The BLM stipulations and recommendations are given in their entirety in Appendix C. With the few exceptions noted, they will be covered in the lease documents, although we do not consider it desirable to restrict ourselves to using them verbatim, and BLM does not expect it.

As noted in Appendix C under the heading General Stipulations, and as stated by BLM in their report, the general stipulations

apply to essentially all the lands involved. The Special Stipulations cover situations that apply to specific units, sites, or tracts of land. All of the specific stipulations and the units to which they apply are identified in Appendix C. In addition, the units for which only the general stipulations apply are listed. Therefore, there should be no confusion on the applicability of stipulations.

The subjects of EPA review of proposed lease documents and surface management responsibilities are covered in the letter to which this discussion is appended.

Environmental Controls in Uranium Ore Processing

The AEC is in full agreement with EPA that all necessary steps should be taken to minimize the environmental impact of uranium ore processing. When mills are located in states which have not entered into agreements with AEC to assume regulatory control, AEC will exert control through licenses for mill operations. In agreement states, of which Colorado is one, AEC will encourage and support the states in their efforts.

Clarification of Specific BLM Stipulations

The standard bond figure of $5,000 recommended by BLM is probably adequate for most of the lease blocks. However, the bond is not limited to a fixed amount, and as BLM suggested

will be adjusted as necessary to assure that it is always sufficient to cover rehabilitation of the property. In some cases a higher initial figure may be used.

AEC agrees with EPA comments on General Stipulations 6 and 17, and will modify them. Stipulation 20 will be modified to simply state that all solid and liquid wastes shall be disposed of in accordance with State and Federal laws, regulations and standards.

Use of Existing Mine Workings

The problems of achieving the 4 WLM standard are well recognized and could preclude use of old workings for access in some cases. This factor has been taken into account. The U.S. Bureau of Mines is inspecting all mines in the Uravan Mineral Belt regularly, and is providing valuable assistance to the mining companies in the design and modification of ventilation systems to meet the standard. The results, which we follow closely, indicate that the standard is being met. However, each mine is a separate problem and must be so handled.

Discharge of Mine Water

The statement has been modified to indicate that the lessee will be required to treat water to meet applicable standards

before it is released from his control, and to maintain adequate records to demonstrate compliance. (See section on Water Quality). The quantity of water to be discharged is not of concern provided it meets quality standards. The portion of report referred to on page 16 of the draft is part of a description of the area as it exists. The subject of controls is addressed later in the statement in the section on water quality.

Tailings from Ore Processing

The summary statement has been expanded to include mention of mill tailings. In addition, information has been added in the section on "Secondary Effects - Uranium Ore Processing" on work that has been done in tailings stabilization at inactive sites.

AEC will continue to support State and Federal activities designed to insure long range control of milling wastes at both active and inactive mill sites. The initial design and operation of tailings dams is also being given close scrutiny with a view toward minimizing the problems of stabilization after the mill closes. We do not know of any mill discharging acid liquors from the site.

EPA recommends that no AEC or agreement state uranium milling license be terminated until that state in which the mill is located has adopted radioactive tailings control regulations.

The state of Colorado has adopted radioactive tailings control regulations and has developed an effective control program. Therefore this recommendation does not apply to Colorado where most of the AEC controlled uranium lands are located. This EPA recommendation is essentially addressed to activities outside the scope of this environmental statement. AEC has recently followed a policy of not terminating licenses at inactive mill sites until tailings have been stabilized. In connection with new mill license applications it is requiring a bond for tailings stabilization. However, AEC will continue to support and encourage state regulation and control of tailings.

AEC will ask Union Carbide Corporation to provide answers to the questions of the EPA concerning the Uravan mill as soon as possible. It should be noted, however, that extensive records over a period of years have indicated that radioactivity levels in the San Miguel River below Uravan have consistently been well within P.H.S. drinking water standards. It has not been brought to our attention that the mill is exceeding State or Federal air or water quality standards. Further, no significant

adverse environmental effects are currently attributed to the operation of the mill. U.S. Geological Survey studies over a period of years indicate that both the dissolved and suspended solids content of the Dolores River are extremely variable, and are also generally at levels far in excess of the amounts that could be attributed to uranium milling. The observed conditions are comparable with other streams in the area.

Whether or not a new mill will be constructed in the Uravan Mineral Belt is a private industry decision, and not an option of the government. There is no reason to assume that any new facility that might be built would employ any different process than the present one, or would reduce environmental impact. As noted previously, AEC is not aware of any significant adverse environmental effect resulting from the current milling operations.

Open Pit Mining

As stated in the summary and under Probable Environmental Effects of the statement, AEC will require reclamation of areas affected by open pit mining. The procedures to be used will be a required part of the mining plan and subject to AEC approval. On Unit NM-B-1, the known ore reserves lie in the extreme south east

corner of Section 13, in an area which has previously been disturbed by open pit mining. We do not believe more than a few additional acres will be involved in surface mining. The relief in this Section exceeds 600 feet, and in much of the area the Jurassic Todilto Limestone, the principal host rock, is too deep for surface mining.

In the event AEC does not lease, the undesirable conditions existing on some properties will probably remain uncorrected unless the Congress should decide to appropriate funds for this purpose. Since the lands still contain valuable ore, it is reasonable to complete the mining before undertaking reclamation.

Alternative Energy Sources

Essentially the same subject was raised in the detailed comments by the Department of Interior, and is covered in our reply to Interior, included in the final report. Additional information has been provided in the statement to put in better perspective the supply-demand situation for uranium as a nuclear power source, both domestically and in other countries.

Industrial Potential in Uravan Mineral Belt

The subject of the reliance of the economy of the Uravan Mineral Belt on mining, and particularly on uranium-vanadium

is treated in some detail in Appendix D of the statement. The studies by A. D. Little and Denver Research Institute indicate no presently known undeveloped resources of the area which could compensate for the adverse economic impact of a rapid decline in uranium activity.

General Comments

The import-export situation is discussed in the final report in the section on alternatives. The ultimate dispensation of royalty funds is mentioned in Appendix C immediately following the list of BLM recommendations. Royalties received will reduce the amount of authorized funds that could otherwise be drawn from the Treasury. They may only be used for purposes authorized by Congress in the budgetary process. The comments on fugitive dust and coordination with Colorado Game, Fish and Parks will be considered by AEC in the administration of the leasing program.

STATE OF COLORADO DEPARTMENT OF HEALTH
4210 EAST 11TH AVENUE • DENVER, COLORADO 80220 • PHONE 388-6111
R. L. CLEERE, M.D., M.P.H., DIRECTOR

July 7, 1972

Mr. Julius H. Rubin
Assistant General Manager
of Environmental Safety
U. S. Atomic Energy Commission
Washington, D.C. - 20545

Dear Mr. Rubin:

This letter is in response to request for comments on the U.S. A.E.C.'s Draft Environmental Statement Leasing of AEC Controlled Uranium Bearing Lands Colorado, Utah, New Mexico, March 1972, (Wash.-1523)

Availability of this document for Department review was provided through the courtesy of the Region VIII offices of EPA. To our knowledge, no official request for comments was received by any office of state government in Colorado.

Enclosed is a summary of staff comments made by key personnel of the Department. If there are any questions regarding their content, please do not hesitate to contact this office.

Sincerely,

Roy L. Cleere

R. L. Cleere, M.D., M.P.H.
Executive Director

RLC:ljw
cc: John A. Love, Governor

COLORADO DEPARTMENT OF HEALTH
STAFF COMMENTS ON THE
DRAFT ENVIRONMENTAL STATEMENT
LEASING OF AEC CONTROLLED URANIUM
BEARING LANDS
COLORADO, UTAH, NEW MEXICO
March 1972 (Wash-1523)

Pages 4 & 11 - References are made to the "loss of presently recoverable reserves could occur." The actual reserve would be intact, however, the recoverable or marketable reserve could be economically irretrievable.

Page 7 - The Uravan Mineral Belt is located in southwest (not southeast) Colorado and eastern Utah.

Page 18 - Union Carbide Nuclear's Corporations (UCN) mill at Uravan is the only uranium mill still operating in the area of concern. UCN is concerned with maintaining a functional operation. With a 3 - 5 year lead time before leased lands operations can be brought up to full production, it may be doubtful whether some of the economic beneficial aspects of this proposal would be attained. It is assumed that the Rio Algom concentrator operation at Moab, Utah, will have little impact on Colorado economics.

Page 26 - While the principal radioactive contaminant of concern may well be radium-226, it is more likely that the principal stream contamination from mining activities would be of silt or other turbidity causing material.

Page 27 - While it is true that most of the mines in this area are dry, it is not a universal fact (i.e. Mesa Creek Mines).

Page 34 - What are the details of the lessee's plans "to assure that provisions for environmental protection are adequate" to entail? Discussion of a typical proposed lease specific content in this regard is most pertinent to this statement.

Page 38 - The statement is made "... no appreciable amount of water is likely to be discharged to the environment from the mines." Because of the constituents of such mine water, it would be preferable that no water be so discharged to either surface or ground waters. Preferred method of disposition would be evaporation and the presumption should be kept that this method will be an almost certain requirement under Water Pollution Control Regulations (state).

Pages 39, 41 and 98 - Reference is made to a new mill to be under AEC jurisdiction. Unless such a mill is a federal facility, it will be under the jurisdiction of the State (Colorado and shortly, New Mexico). In Colorado the Rules and Regulations Pertaining to Radiation Control and Water Pollution Control would be rigidly enforced. Regarding Air Pollution Control, the following pertinent information applies for the control

and maintenance of air quality in the State:

1) For most areas of the State, where the existing air quality is better than the current ambient air quality standard, this air quality will be protected, thus significant degradation of Colorado's air resources will be prevented. Furthermore, potential new sources of air pollution will not be allowed to significantly endanger the maintenance and attainment of state and federal ambient air quality standards for these areas. This policy, commonly referred to as the "non-degradation clause" has been in effect since 1971 in the State.

2) Elsewhere in the State, primarily the designated air pollution control areas, those regulations adopted by the Commission and currently in effect will apply. Specifically these regulations are:

   Regulation No. 1 titled - "Emission Control Regulations for Particulates, Smokes and Sulfur Oxides for the State of Colorado"

   Regulation No. 2 - "Odor Emmission Regulations"

   and

   Regulation No. 3 - "Regulation Governing Authority to Construct and Permit to Operate"

Page 109 - There must be provision for providing lease funds for the complete restoration of this land; otherwise, the lessee's plans "to assure that provisions for environmental protection are" inadequate.

ljw
7/72

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Roy L. Cleere, M.D.
Executive Director
State of Colorado Department of Health
4210 East 11th Avenue
Denver, Colorado 80220

Dear Dr. Cleere:

We appreciate receiving the Department of Health comments on the draft environmental statement, Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico. Your comments and those of others have been taken into account in preparation of the final statement, a copy of which is enclosed for your information.

We regret that you experienced difficulty in obtaining a copy of the draft for review. Copies of the draft statement were sent on March 22, 1972, to both Governor Love and his designee, the Executive Director of the Department of Local Affairs, to obtain the review of the appropriate State agencies. The latter distribution was made in accordance with procedures established by the Council on Environmental Quality.

The type of information that will be required of lessees in both exploration and mining plans is indicated by the outline prepared by the Bureau of Land Management (BLM), a copy of which is enclosed.

The Commission will cooperate fully with the State of Colorado in its active program of environmental control. We are aware of the regulations cited, and will appreciate your bringing to our attention also any new requirements as they are developed.

As noted in BLM recommendation B (page 108 of the draft statement), a performance bond will be required of each lessee in an amount no less than required to put the land in desired

final condition. This applies only to the lease area. The comment on page 109 of the draft applies to establishment of a joint funding program which presumably would extend to lands outside the AEC controlled lands.

Sincerely,

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosures:
1. Environmental Statement - Leasing of AEC Controlled Uranium Bearing Lands
2. Outline - by the Bureau of Land Management

cc: John A. Love, Governor

STATE OF NEW MEXICO
Environmental Improvement Agency
P. O. Box 2348, Rm. 215, Santa Fe, N. M. 87501

SPECIAL PROJECTS SECTION

May 5, 1972

Mr. Julius H. Rubin, Assistant General
Manager for Environment and Safety
United States Atomic Energy Commission
Washington, D. C. 20545

RE: Environmental Statement - Leasing of A.E.C. Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico

Dear Mr. Rubin:

The draft environmental statement submitted by the Atomic Energy Commission has been reviewed by members of the Environmental Improvement Agency.

Although the land area involved in New Mexico is quite small when compared with the total leasing area, we feel that significant environmental impact could occur in our state unless more specific actions are taken by the Atomic Energy Commission.

Our comments are as follows:

A. Assessment of Impact, and Proposed Control Method

The measures recommended by BLM and contained in Appendix C of this statement are, in our opinion, well thought out and should provide a high degree of protection for the environment if implemented. We feel, therefore, that the language contained in paragraph 7 of the above heading should be changed from "The A.E.C. plans to provide" to "The A.E.C. will provide".

B. Probable Environmental Effects
4. Secondary Effects - Uranium Ore Processing

Paragraph 6 of this section speaks of the serious problems that have occurred in Colorado as the result of removing sand tailings and using them as fill in construction projects. Although states may establish regulations in this regard, we feel that the Atomic Energy Commission should accept responsibility for making appropriate controls over the sale of such materials part of the leasing agreements in order to avoid any future occurrences of this problem. The leasing agreements should require compliance with state regulations if they are more stringent than those of the A.E.C.

We hope that these comments will help you in preparing the final draft of this statement. The opportunity to comment is appreciated.

Sincerely,

J. H. Hottenroth, P. E.
Chief, Special Projects Section

cc: Thomas Baca, Environmental Manager, Regions I and III

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. J. H. Hottenroth, P. E.
Chief, Special Projects Section
Environmental Improvement Agency
State of New Mexico
P. O. Box 2348, Rm. 215
Santa Fe, New Mexico 87501

Dear Mr. Hottenroth:

Thank you for the review and comments on the draft environmental statement, Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico. A copy of the final statement is enclosed. Modifications have been made where appropriate to reflect your comments and those of others reviewing the draft statement.

With regard to your specific comments, the section under "Secondary Effects--Uranium Ore Processing" has been expanded to reflect the controls instituted by the State of Colorado in regulations adopted in December 1966 for control of uranium mill tailings, and the progress that has been made since then in stabilization of inactive tailings piles. The regulations and controls instituted by the State of Colorado are providing adequate protection to the public. Other states, whether or not they have agreed to assume regulatory responsibilities from AEC, should consider the adoption of tailings control regulations. Not all radioactive residues and wastes are high enough grade to qualify as source material subject to AEC licensing requirements and, hence, subject to AEC control. State regulation is a broader and more direct approach to the control of tailings than through the proposed lease agreements on AEC lands, since the ore from these properties may go to only a few mills.

Sincerely,

Julius H. Rubin

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosure:
Environmental Statement -
Leasing of AEC Controlled
Uranium Bearing Lands

CC: Honorable Bruce King

GUNN McKAY
1ST DISTRICT, UTAH

APPROPRIATIONS
COMMITTEE

Congress of the United States
House of Representatives
Washington, D.C. 20515

June 2, 1972

The Honorable W. B. McCool
Secretary of the Commission
Atomic Energy Commission
Washington, DC 20545

Dear Commissioner McCool:

Enclosed is a copy of a letter I recently received from Mr. Vernon J. Tipton, Director, Center for Health and Environmental Studies at Brigham Young University.

Mr. Tipton has expressed his views on the draft environmental statement related to leasing of AEC controlled uranium bearing lands in Colorado, New Mexico and Utah. I have advised Mr. Tipton that I would ask for your views on his comments, and I would appreciate your complying with my request.

Thanks for your assistance.

Best wishes,

Gunn McKay
Member of Congress

GM/G

Enclosure

Brigham Young University

May 19, 1972

Congressman Gunn McKay
House of Representatives
Washington, D. C. 20515

Dear Mr. McKay:

This is a belated comment on the draft environmental statement related to leasing of AEC controlled uranium bearing lands in Colorado, New Mexico and Utah.

We recognize that this is a draft statement but none the less feel compelled to draw attention to two or three omissions of some import and some inaccuracies. Comments are made in relation to page number.

Page 23:

The statement regarding wildlife is misleading and incomplete. There are many species present other than those mentioned. According to Hayward et. al., there is a much greater variety of vertebrate species present than the statement indicates, especially in the Elk Ridge area. The vegetation in the latter area supports a large variety of invertebrate animals which figure prominently in food webs. It is obvious that a thorough survey of the area is needed. The statement that "No rare or endangered species of birds, fish, or reptiles were found on the lease sites" is presumptuous. Ecological investigations have been too meager to provide information required.

Page 27:

The description of the "Timber" in the forestry section is inaccurate in that "pinon and juniper with small areas of scattered ponderosa pine" constitute only a portion of the

Center for Health and Environmental Studies, 786 WIDB, Brigham Young University, Provo, Utah 84601 (801) 374-1211, Ext. 3838 and 3[illegible]

total plant life. The understory, made up of a variety of shrubs, is an important constituent of the ecosystem on which browsing animals depend and other animals utilize for shelter and nesting. Only the aesthetic value of the timber is mentioned but in areas of low rainfall and sparse vegetation where precipitation is often in the form of cloudbursts, plants are essential in preventing erosion.

We recommend the following:

1. Each unit considered for lease should have an ecological inventory prior to disturbance. These base line studies would be aimed at determining status of endemic species of plants and animals and the impact of mining operations and associated acitivites on these species.

2. If endangered species occur in the area and if mining operations are likely to have a deleterious effect on these species, then appropriate provisions should be made at the planning stage to protect them.

3. Provisions should be made for the restoration of disturbed areas under the supervision of a team of consultants who have demonstrated expertise in conservation techniques.

Sincerely,

Vernon J. Tipton pc

Vernon J. Tipton
Director

VJT:pc

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Dr. Vernon J. Tipton, Director
Center for Health and Environmental Studies
786 WIDB
Brigham Young University
Provo, Utah 84601

Dear Dr. Tipton:

Thank you for your comments on the draft environmental statement - Leasing of AEC Controlled Uranium Bearing Lands - Colorado, Utah, New Mexico. Your letter of May 19, 1972, was forwarded to us by the Honorable Gunn McKay, Member of Congress, 1st District, Utah.

Enclosed is a copy of the final statement. Modifications have been made to take into account comments received on the draft.

The measures you have suggested will be considered in the planning and conduct of the leasing program.

Sincerely,

Julius H. Rubin

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosure:
Environmental Statement -
Leasing of AEC Controlled
Uranium Bearing Lands

cc: Honorable Gunn McKay

UNION CARBIDE CORPORATION
MINING AND METALS DIVISION
270 PARK AVENUE, NEW YORK, N. Y. 10017

J. C. STEPHENSON
PRESIDENT

May 2, 1972

Mr. Robert D. Nininger, Director
Production and Materials Management
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Nininger:

We have reviewed with interest the very extensive Draft Environmental Statement concerning the AEC controlled uranium bearing lands. We find it comprehensive and professional. Although we might question the potential for as much as twenty years of operation, the five years used in the cost-benefit analysis would seem reasonable if the lands can be made available promptly.

In order to avoid any future misunderstandings, we would like to note the statement on page 42 regarding Union Carbide's willingness to purchase ore obtained from these lands. Our position was stated in my letter of May 25, 1970 to Mr. R. L. Faulkner indicating our interest in purchasing ore from independent producers and stating that such purchases would be subject to our amenability standards and buying schedules then in effect. Clearly, we cannot simply undertake to accept any or all ore offered.

The new Federal regulations regarding radon daughter exposure will surely have a negative influence on the valuations to be placed on these properties. We would like to state again that we believe the new regulations to be arbitrary and ill-founded and to seek the cooperation of the AEC in having them reevaluated at an early date.

We appreciate having an opportunity to review the Statement.

Very truly yours,

J. C. Stephenson

JCS:bmr

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Mr. J. C. Stephenson, President
Union Carbide Corporation
Mining and Metals Division
270 Park Avenue
New York, New York 10017

Dear Mr. Stephenson:

Thank you for the review and comments in your letter of May 2, 1972, to Mr. Nininger on the draft environmental statement, Leasing of AEC Controlled Uranium Bearing Lands, Colorado, Utah, New Mexico. Enclosed is a copy of the final environmental statement. Modifications have been made to reflect comments on the draft.

In response to your specific comments, we have noted your condition that the ore to be purchased must be amenable.

Please note in particular in Appendix F to the final environmental statement the letter of comments received from the Environmental Protection Agency and our reply to them. The Environmental Protection Agency lists certain information that they would like to have concerning the operation of the Uravan Mill. We request that you provide answers to the Environmental Protection Agency's questions as soon as possible.

Sincerely,

Julius H. Rubin
Assistant General Manager
for Environment and Safety

Enclosure:
Environmental Statement -
Leasing of AEC Controlled
Uranium Bearing Lands